

...to preserve, protect, and interpret the natural and cultural resources relating

KEWEENAW



NATIONAL
HISTORICAL
PARK

current and future generations through cooperative efforts and partnerships...

to the copper mining industry for the enjoyment and benefit of

(DRAFT)

FIRE MANAGEMENT PLAN

FOR

KEWEENAW NATIONAL HISTORICAL PARK

SEPTEMBER 14, 2004

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I. Introduction

A. Reasons for plan

This Fire Management Plan (FMP) outlines actions that will be taken by Keweenaw National Historical Park (park) in meeting the fire management goals for the unit. The park was established to preserve the nationally significant historical and cultural sites, structures, and districts of a portion of the Keweenaw Peninsula in the State of Michigan for the education, benefit, and inspiration of present and future generations; and to interpret the historic synergism between the geological, aboriginal, sociological, cultural, technological, and corporate forces that relate the story of copper on the Keweenaw Peninsula. It demonstrates a new concept in National Park Service (NPS) facilities by utilizing cooperative agreements to manage interpretive activities through state and local governments, citizens' groups, businesses, and individuals, as well as a small amount of federally owned property.

National Park Service Director's Order #18 requires that

"All NPS units with vegetation that can sustain fire must have a Fire Management Plan."

This FMP serves as a detailed program of action by providing specific guidance and procedures for accomplishing wildland fire management objectives stated in the previously mentioned directive. It addresses wildland fire suppression, where protection of structures, cultural resources, and neighboring properties is paramount. The plan allows the park to manage natural resources in the most effective and efficient manner, including the use of prescribed fire for disposal of vegetation debris and various non-fire techniques.

B. Collaboration

The FMP was developed through a collaborative process involving park staff, Midwest Regional Office (MWRO) staff, and NPS Fire Program (FIREPRO) staff. The Michigan Department of Natural Resources (DNR) participated in the park scoping of alternatives and has entered into an interagency cooperative agreement for suppression of wildland fire. The park Advisory Commission, consisting of partners in the National Historical Park, has been involved in the planning process. The NPS is a member of the Michigan Interagency Wildland Fire Protection Association which promotes cooperation in fire prevention training, technology, and operations. Incorporating the assistance and expertise of federal and non-federal organizations resulted in a thorough treatment of fire management in the park.

Implementation of the FMP will further develop formal and informal ties with the Quincy-Franklin-Hancock Townships Fire Department and Calumet Township Fire and Rescue, which provides fire protection to the park. A formal agreement has been developed with the Quincy-Franklin-Hancock Townships Fire Department for response to wildland fire.

C. Achieving resource management goals

Director's Order #18 states that,

"The overall resource management objectives for an NPS unit must guide Fire Management Plans. The resource management objectives will determine whether and how fire will be managed."

This plan will implement fire management policies and help achieve resource management and fire management policies and goals as outlined in: (1) *Federal Wildland Fire Management Policy and Program Review 2001*; (2) *Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy (USDOI/USDA)*; (3) *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan 2001*; and (4) *the Keweenaw National Historical Park General Management Plan*.

Overall adverse wildland fire impacts will be held to the minimum possible giving full consideration to:

- firefighter and public safety,
- an aggressive fire prevention program,
- the least expenditure of public funds for effective suppression,
- the methods of suppression least damaging to resources and the environment, and
- integration of cooperative suppression actions by local fire departments.

D. National Environmental Policy Act of 1969

Any fire management implementation activities will impact the surrounding environment and social and fiscal concerns of persons in the affected area. It is imperative that fire management activities not cause unacceptable social, legal, or biological impacts within the park or adjacent to it. Therefore, the process by which fire management alternatives were assessed was guided by the *National Environmental Policy Act of 1969* (NEPA). An environmental assessment (EA) functions as the NEPA documentation for analysis of a range of reasonable, short-term management alternatives and their direct, indirect, and cumulative impacts. The EA associated with fire management planning is located in Appendix D.

The FMP will incorporate a programmatic approach to NEPA compliance that covers all activities described in the plan. This will reduce the need for NEPA documents for individual projects addressed in the FMP. Additional NEPA (Environmental Impact Statements, Environmental Assessments, or Categorical Exclusions) for specific activities would be undertaken if external controversial issues arise.

This document complies with NEPA and requirements of the Michigan State Historic Preservation Office (SHPO). The SHPO consultation is documented in Appendix D, and meets Section 106 of the *National Historical Preservation Act of 1966* (NHPA) requirements. Endangered Species Act (as amended in 1973), Section 7 consultation with the U.S. Fish and Wildlife Service and consultation with the DNR is documented in Appendix D. Consultation with all tribal councils associated with the park has been completed and documentation appears in

Appendix D. The Michigan Department of Environmental Conservation provided air quality compliance information which also appears with the EA.

E. Authorities

The *Organic Act* of the National Park Service (August 25, 1916, Section 102) provides the authority for implementation of this plan. This act states that the primary goal of the National Park Service (NPS) is to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.

The NPS management policies (*Director's Order – 18* revised November 2002, DO-18, and *Reference Manual 18* revised December 2002, RM-18) provide guidance for FMP implementation. The park fire management objectives conform to the referenced documents. Servicewide fire management policy is expressed in the current revisions of the Director's Orders and attendant Reference Manual, and other documents incorporated herein by reference.

The authority for NPS Fire Program funding (FIRREPRO), Normal Fire Year Programming, and all emergency fire accounts is found in the following authorities:

- Section 102 of the General Provisions of the Department of Interior's (DOI) annual Appropriations Bill - provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.
- Public Law 101-121, DOI and Related Agencies Appropriation Act of 1990 - established the funding mechanism for normal year expenditures of funds for fire management purposes.
- 31 U.S.C. §665 (E) (1) (B) - provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

Authorities for procurement and administrative activities necessary to support wildland fire suppression missions are contained in the *Interagency Incident Business Management Handbook (USDA/USDOI)*. Authorities to enter into agreements with other Federal bureaus and agencies; with state, county, and municipal governments; and with private companies, groups, corporations, and individuals are cited in *NPS Director's Order #20: Agreements* (DO-20, USDI 1999).

Authority for interagency agreements is found in *Interagency Agreement between the Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), National Park Service, U.S. Fish and Wildlife Service (USFWS) of the United States Department of the Interior (USDI) and the Forest Service (USFS) of the United States Department of Agriculture (USDA) of 1982*. Authority for rendering emergency fire or rescue assistance outside the National Park System is the Act of August 8, 1953 (16 U.S.C. §1b (1)) and the *Department of the Interior Manual* (910 DM).

Statutes cited below authorize and provide the means for managing wildland fire on lands under the jurisdiction of the Department of the Interior, or lands adjacent thereto.

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C. 594)
- McSweeney-McNary Act of 1928 (45 Stat. 221; 16 U.S.C. 487)
- Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535)
- Taylor Grazing Act of June 28, 1934 (48 Stat. 1269; 43 U.S.C. 315)
- O. and C. Act of August 28, 1937 (50 Stat. 875; 43 U.S.C. 1181e)
- National Park Service Acts as amended (67 Stat. 495; 16 U.S.C. 1b)
- Federal Property and Administrative Service Act of 1949 (40 U.S.C. 471; et seq.)
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66; 42 U.S.C. 1856a)
- National Wildlife Refuge System Administration Act of 1966 as amended (80 Stat. 927; 16 U.S.C. 668dd through 668ee)
- Alaska Native Claims Settlement Act of December 18, 1971 (85 Stat. 688; 43 U.S.C. 1601)
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121)
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C. 2201)
- Federal Land Policy and Management Act of 1976 (90 Stat. 2743)
- Federal Grant and Cooperative Agreement Act of 1977 (P.L. 950224, as amended by P.L. 97-258, September 13, 1982 (96 Stat. 1003; 31 U.S.C. 6301 thru 6308)
- Alaska National Interest Lands Conservation Act of December 2, 1980 (94 Stat. 2371)
- Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837)
- Wildfire Suppression Assistance Act of 1989 (P.L. 100-428, as amended by P.L. 101-11, April 7, 1989)
- Indian Self-Determination and Education Assistance Act (PL 93-638) as amended
- National Indian Forest Resources Management Act (P. L. 101-630 November 28, 1990)
- Tribal Self-Governance Act of 1994 (P.L. 103-413)
- Department of the Interior and Related Agencies Appropriations Act (P.L. 103-32)

II. Relationship to land management planning and fire policy

Resource management planning has a primary goal of appropriate stewardship of park resources, so as to preserve the values and support the themes of the park unit. Generally, the natural resources component of resource management includes vegetation planning and closely relates to landscape reports. The landscape reports set the direction for vegetation planning and define the desired conditions. The park has just begun development of reports and plans to guide day to day management decisions for the newly acquired land holdings. These plans, including the FMP, are based on the broad description of desired future conditions outlined in the General Management Plan of 1998 and the enabling legislation.

This section identifies for fire managers in broad programmatic terms the direction found in the General Management Plan and enabling legislation, specifying goals, objectives, and desired future conditions as they pertain to fire management activities. It shows the relationship between fire management implementation and natural processes of the environment.

A. NPS management policies

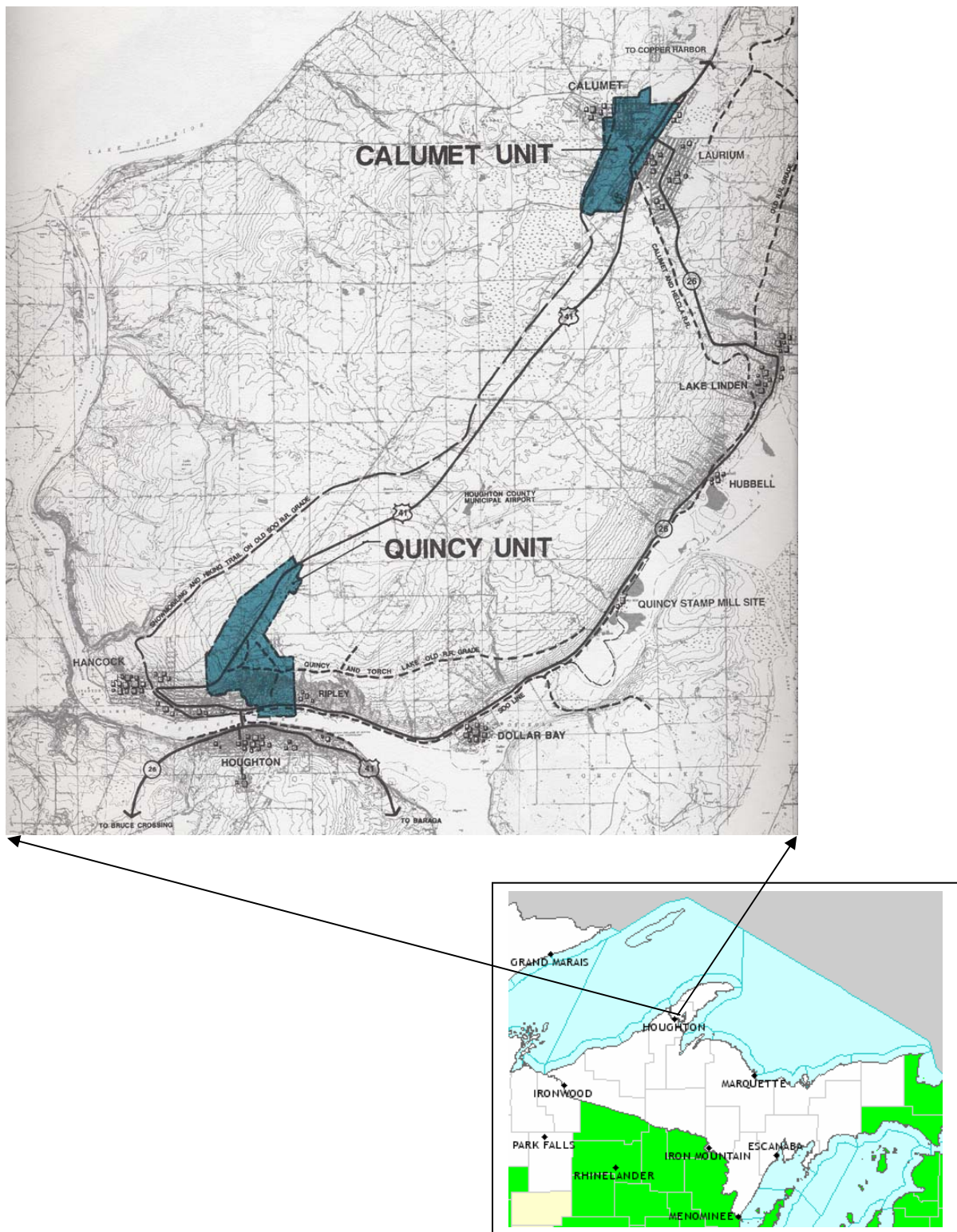
It is the policy of the NPS to allow natural processes to occur to the extent practical while meeting park unit management objectives. The goal of fire management in the NPS system is to restore fire to ecosystems where appropriate and possible. In August 2002, the President issued the Healthy Forest Initiative to address the backlog of fuel reduction projects. The NPS will strive to restore ecosystems to natural fire regimes and fuel levels, whenever possible. The NPS units with long interval fire regime ecosystems, as in this park unit, may need little or no regime restoration, but will need management and planning to ensure that fire plays an appropriate role in the ecosystem.

The NPS management policy directs each unit to prepare a wildland fire management plan appropriate for that unit's purpose and resources. Principal considerations in fire management programs, designated in DO-18 and stipulated in RM-18, include

- protection of human life, both employee and public
- protection of facilities and cultural resources
- perpetuation of natural resources and their associated processes

These considerations apply to the park and the surrounding settlements and landscape (Figure 1).

Figure 1: Map of Calumet and Quincy Unit relative locations



B. Enabling Legislation and Values on Site

Congress passed Public Law 102-543 in October of 1992 establishing the Keweenaw National Historical Park. Park boundaries have not been finalized and remain subject to modification with current planning based on descriptions published in the Federal Register on November 24, 1993.

Mission Statement

The mission of Keweenaw National Historical Park is to preserve, protect, and interpret the natural and cultural resources relating to the copper mining industry for the enjoyment and benefit of current and future generations through cooperative efforts and partnerships with state and local governments, public and private entities.

Historical Significance

The significance of the park is the story of copper and its relation to the development of an industrialized society in the United States. The Keweenaw embodies a unique geologic occurrence of pure elemental copper and contains remnants of the oldest known metal mining activities in the western hemisphere. The Calumet and Quincy Units within the park (Figure 1) are representative examples of locations with the longest duration, greatest production, and most technologically innovative copper mining in America. Both sites attracted a rich diversity of immigrants.

The park contains many cultural resources, including archeological resources, that are important to the prehistoric scene, the historic scene, and specifically to the story of copper. Many will be lost if they do not receive protection. This park unit is one of a new generation of parks that is not based on federal land acquisition, but rather on cooperative agreements with private and other governmental entities dedicated to the preservation and interpretation of history on the Keweenaw Peninsula. The park's cooperative partnerships are an attempt to protect the experience of place. The memories and senses attached to this very special place capture the essence of our nation's accomplishments and development into an industrial and economic power.

C. Relationship of FMP to General Management Plan

The General Management Plan (GMP) identifies the strategies, programs, and actions necessary to manage visitation and best protect the park resources. This document describes resource conditions and visitor experiences to be achieved in the park. Requirements are based on the park unit's purposes, significance, special mandates, administrative commitments, and the body of laws and policies directing the management of the National Park System. The document maintains that the park will manage resources to support the mission. The GMP preferred alternative for the park combines a strong presence of the NPS in the park with community assistance in a well organized cooperative venture to protect and interpret resources, while providing the optimum opportunity for high-quality visitor experiences.

With the acquisition of land, the park has taken on a physical presence within the park boundaries. The ownership of land results in consideration of its management. As responsible stewards, NPS will manage land and its resources to

a level that meets all applicable laws, policies, and NPS standards, while being a good neighbor to surrounding landowners and the respective communities.

D. Relationship of FMP to Resource Management Plan

A Resource Management Plan (RMP) would nest within the authority of the GMP and would relate directly to resource management on the unit. An RMP does not exist for the park. The GMP remains the principle management guide as the NPS takes on the responsibility to manage land acquisitions in a manner

- compatible with the nature of the site
- that provides educational and interpretive opportunities
- that does no harm to species of concern using the habitat
- that does not adversely impact neighboring land
- that promotes best management practices for soil, water, and native species conservation, including control of invasive and exotic species

Because fire management programs are designed to meet resource management objectives (*NPS Management Policies 2001*), this document presents the best fire management methods for achieving hazard fuel mitigation.

E. Meeting Objectives of the GMP and RMP

The FMP will become a tool for resource management on the park. A combined approach of mechanical treatments and disposal of landscape debris using fire will be used to maintain safe fuel conditions. Frequent fire was not a part of this ecosystem and should not be considered a natural process to be restored in this context.

Implementation of the FMP will

- reduce hazard conditions through mechanical mitigation and disposal of landscape debris, thus reducing the opportunity for wildland fire threats to human life and cultural resources in and around the site
- protect and conserve the natural and historic resources associated with the period of significance by setting the guidelines associated with fire suppression

Implementation of the FMP will also contribute to meeting goals specified in the Strategic Plan, as part of the requirements of the *Government Performance and Results Act*.

Wildland fire will be met with suppression in this unit, because of values on site and the urban proximity. Prescribed fire is not appropriate to this environment or to the vegetation types located here and will not be used. The presence of historic structures in the park, and people and human development around the unit, require that protection of life and property be a primary concern in fire management.

III. Wildland Fire Management Strategies

A. General Management Considerations

Two goals for a fire management plan are to reduce the impacts of wildland fire through hazard fuel mitigation and to support management goals of the park. The park will manage fire in a manner that protects human life and property; suppress all wildland fires immediately with the least adverse impact to resources; protect cultural resources, including all known historic fabric, while maintaining a natural setting and achieving vegetation and cultural resource management goals. The park will comply with the National Interagency Mobilization Guide in all applicable aspects for wildland fire management and will pursue mutual assistance agreements with nearby fire management units. The core principles of the 10-Year Comprehensive Strategy, including collaboration, priority setting, and accountability, will be considered.

B. Wildland Fire Management Goals

1. *Make firefighter and public safety the highest priority of every fire management activity.* Protection of human life is reaffirmed as the first priority in wildland fire management.
2. *Manage wildland fires and debris burning in concert with federal, state, and local air quality regulations.*
3. *Suppress all wildland fires regardless of ignition source to protect the public; check fire spread onto private property.*
4. *Manage wildland fires so that park resources (natural, cultural, and improvements) are protected from damage by suppression actions and fire.*
5. *Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.*
6. *Integrate fire management with all other aspects of park management.*
7. *Reduce wildland fire hazard around developed areas, along interface areas and adjacent to cultural and historic values.*

Department of the Interior policy as specified in *Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide* (2001) states that all fires in wildland fuels will be classified as either “wildland fire” or “prescribed fire.” Wildland fire is defined as any non-structural fire, other than prescribed fire, that occurs in the wildland. These fires can, but do not always, achieve burning intensities capable of causing loss of life, detrimental impacts upon natural resources, and damage to, or destruction of, human-made developments. Because of the park proximity to developed land, all wildland fire will be considered unwanted and be met with a suppression response. Prescribed fire is defined as any fire ignited by management actions to meet specific objectives, this includes the ignition of landscape debris in burn piles. These fires are conducted under prescription in such a way that will control the intensity of heat to protect soil and subsurface cultural features.

Federal wildland fire policy is established in the *Federal Wildland Fire Management Policy & Program Review of 1995* (USDA/USDI 1995). This policy was reviewed following the 2000 fire season (USDA/USDI 2001) and the following statements were made,

“The 2001 Federal Fire Policy and its implementation are founded on the following Guiding principles:”

1. *Firefighter and public safety is the first priority in every fire management activity.*
2. *The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.*
3. *Fire management plans, programs, and activities support land and resource management plans and their implementation.*
4. *Sound risk management is a foundation for all fire management activities.*
5. *Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.*
6. *Fire management plans and activities are based upon the best available science.*
7. *Fire management plans and activities incorporate public health and environmental quality considerations.*
8. *Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.*
9. *Standardization of policies and procedures among federal agencies is an ongoing objective.”*

The *Federal Wildland Fire Policy of 1996* states,

“Wildland/urban interface protection is important to the Federal government because federally managed lands are located adjacent to or among State lands and developed private lands.”-

The NPS has implemented programs under the President's Fire Initiative (known as the *National Fire Plan of 2000*). The *National Fire Plan of 2000* addresses wildland fire management in two goals that apply directly to the park:

- reduce hazard fuels in high-risk areas to protect communities; and
- reduce hazard fuels in high-risk areas to protect natural and cultural resources and maintain ecosystem functions.

The first objective is often referred to as hazardous fuels mitigation at the wildland urban interface (WUI). The second objective implies that fuels will be removed in a manner that maintains or benefits natural processes.

The *10-Year Comprehensive Strategy of 2001, A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment* (USDOI/USDA), sets core principles to guide strategies for wildland fire risk reduction. These principles include concepts such as collaboration, priority setting, and accountability. A community based approach to wildland fire issues

combines cost effective fire preparedness and suppression to protect communities and the environment proactively.

The *Cohesive Strategy for Protecting People and Restoring Land Health 2001* (USDOI/USDA) provides Department of Interior agencies with a framework for reducing the risk and consequences of unwanted fire by protecting, maintaining, and restoring land health and desired fire cycles on lands under Interior stewardship. It places a priority on WUI and cultural and historic resource preservation (including cultural landscapes). As with the *10-year Comprehensive Strategy*, collaboration is emphasized.

The NPS fire program goals and this plan reflect federal fire policy and the core principles and goals of the *10-year Comprehensive Strategy*, and *Cohesive Strategy*, where supported by land and resource management plans. This plan takes into account and considers the interests of the nearby communities, human life, and property, as well as the protection of cultural and natural resources on site.

C. Wildland Fire Management Options

This section displays the scope of wildland fire management program elements that will be implemented within the park and further developed through the FMP. Within the context of the EA, several treatments were considered to achieve hazard mitigation and landscape goals. Within the context of the FMP these treatments coalesce into strategies.

Wildland Fire Use

One management strategy not available to the park is wildland fire use. Wildland fire use is a strategy for allowing naturally ignited wildland fires to burn as long as the fire meets pre-stated resource management objectives in the maximum manageable area and prescriptive parameters are not exceeded. Due to the relatively small area involved in this unit and the surrounding values, a wildland fire use program will not be implemented.

All fire that is ignited by means other than by trained personnel, following a defined prescription, will be considered unwanted wildland fire. Wildland fire will be met with immediate suppression in the park.

Wildland Fire Suppression

All wildland fires will be suppressed using initial attack actions and using appropriate management response. Management responses to specific wildland fires will be determined through evaluation of public and firefighter safety, fire behavior, values at risk, potential suppression damage, and availability of fire management resources. Management responses will vary from fire to fire and sometimes even along the perimeter of a fire. All available park and local firefighting resources will be utilized as necessary to limit damage to values at risk, protect private and public lands outside the parcel borders, and provide for the health and safety of fire fighters and the public. Appropriate management response options range from containment and monitoring to intense suppression actions on all perimeters of the fire.

Crews responding to wildland fire would use Minimum Impact Suppression Tactics (MIST), to minimize the impacts to cultural and natural resources. Since

the park has only two qualified fire fighters on staff, it relies on a cooperative agreement with the Quincy-Franklin-Hancock Townships Fire Department for support in FMU 1. The NPS has provided nearly \$12,000 in funding for equipment and training materials for local fire fighters in WUI situations.

Prescribed Fire

The use of prescribed fires may be authorized under an approved fire management plan and can be of significant importance in achieving resource management objectives. Prescribed fires are intentionally ignited under predetermined weather and fuel-moisture conditions allowing managers to exert substantial influence over the behavior of the fire. Managers ignite these fires to accomplish resource management objectives and reduce hazard fuel. Prescribed fire can be used as a method to dispose of landscape debris. All prescription parameters, acceptable ranges, and objectives are clearly stated in a Prescribed Fire Plan for each prescribed fire conducted.

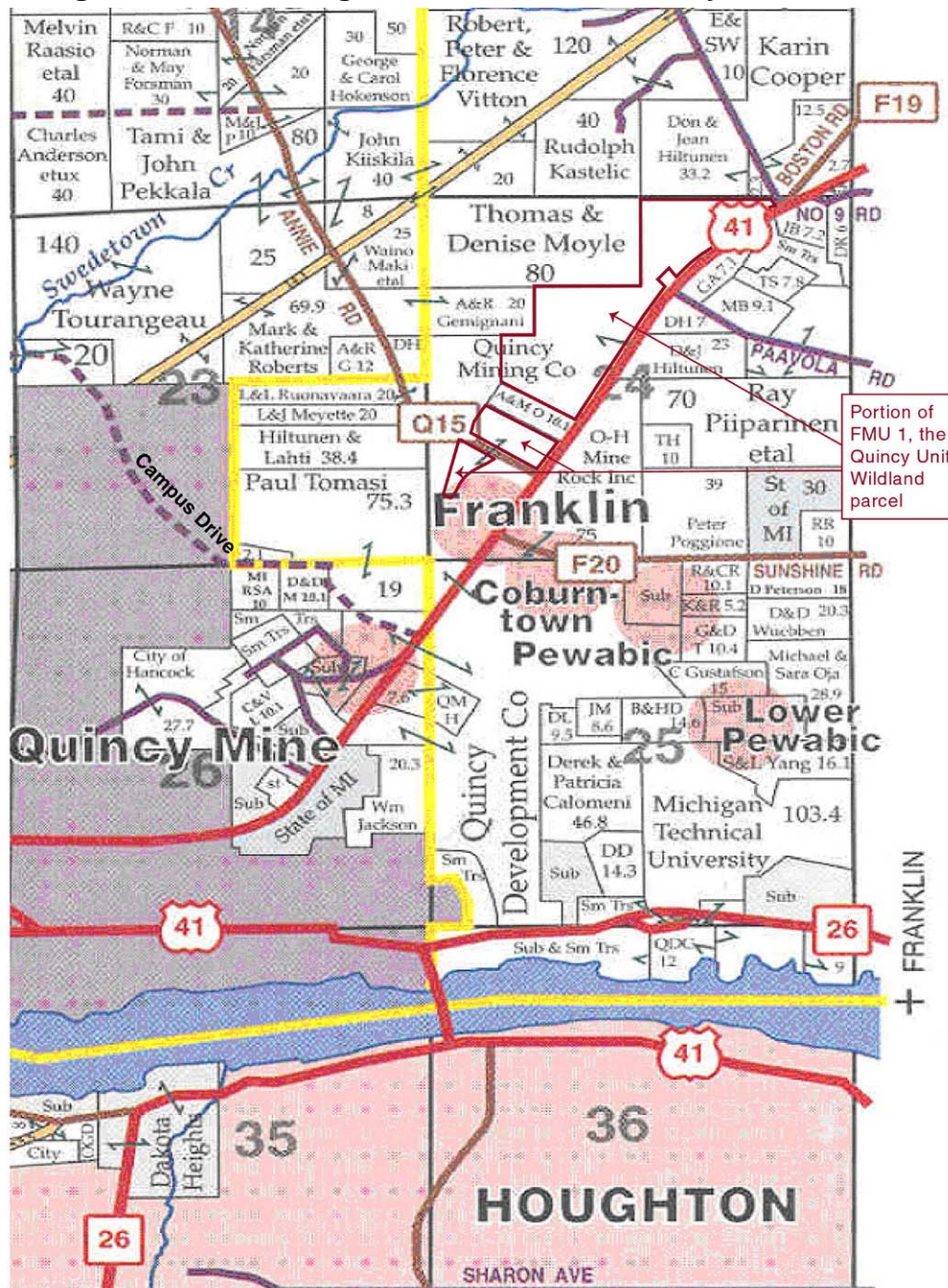
Historically, wildland fires occasionally occurred in the vicinity of the Quincy Unit, but forest type suggests that it was not common (Martin Jurgenson, Professor of Forestry, Michigan Technological University, written communication). Fire can be used to remove understory and reduce hazard fuel conditions in fire-adapted hardwoods and conifers, but can be detrimental in forests with species that are not fire-dependent as is the case for northern hardwoods. Broadcast prescribed fire will not be used in the park. Mechanical and manual mitigation of hazardous fuels could be used in conjunction with the use of fire in landscape debris disposal (burn piles). These projects will be documented with a written Prescribed Fire Plan approved by the park superintendent. The Prescribed Fire Plan will describe the hazards and the values at risk. It will specify proposed actions. The park would remove fuels from hazard areas and place them in burn piles for ignition. Qualified firefighters would conduct the prescribed burns in the manner specified by the Prescribed Fire Plan. Firefighter, public, and visitor safety including safety in travel corridors will be of highest priority, followed by protection of public and private property.

Non-Fire Applications

Mowing herbaceous vegetation and cutting with weed whackers, hand tools, and chain saws would be effective hazard fuel mitigation techniques. Pruning saws and chainsaws could remove the lower limbs, those that may cause hazard conditions, within an existing pine plantation. On the ground decisions should be made as to whether hazard conditions necessitate the removal of cut vegetation.

The park has considered the purchase of a chipper and the redistribution of chips as a method of debris disposal. The use of a chipper or the redistribution of fuels may be effective ways of mitigating hazards without the use of fire. Cut material could be left to decompose on the soil or could be removed, depending on local hazard fuel conditions and decomposition rates. Judgment would be made on the ground and adaptive management employed.

Figure 2: Fire Management Unit within Quincy Unit



D. Description of Wildland Fire Management Strategies by Fire Management Unit (Figure 2)

Identification of Fire Management Units (FMUs) is the cornerstone for planning the management of the wildland fire program. An FMU is any land management area or major fire regime group in which management characteristics differ from those of an adjacent fire unit. Each FMU should be unique as evidenced by management strategies, objectives, and attributes. Management goals and

objectives found in land and resource management planning are factors to be considered in developing strategies.

For purposes of clarity, the word “parcel” will refer to land holdings and its ownership with the word “border” referring to the bounding lines of a parcel. The word “boundary” is reserved for the park boundary, which includes both the greater Calumet and Quincy Units.

The park is broken into two distinct FMUs, one being the parcels within the Quincy Unit and the other being the parcels in the Calumet Unit. Landscape types and objectives fall into two main categories that define the FMUs of the park: the majority of FMU 1 is relatively natural second-growth plant communities, but there are also several parcels that are managed “urban” settings with structures; FMU 2 is an intensely managed, urban setting with structures. Fire will not be used in FMU 2, because there is no wildland, and the FMP will outline suppression only in this unit. The FMU 1 will allow a limited type of prescribed fire in the wildland portion, specifically the burning of brush piles, as well as non-fire management techniques to mitigate hazard fuels. No landscape objectives have been identified in FMU 1.

FMU 1: Quincy Unit federally owned property

a. Physical and biotic characteristics

The park boundaries include private property, as well as the federally owned land, but this FMP will only address the Quincy Unit federally owned parcels. The park has not completed inventories of its natural or cultural resources on the 104 acres of FMU 1. The border is generally known, but a ground survey has not marked the federal land borders. There are also four smaller parcels of federally owned land within the Quincy Unit, but these are within a managed, semi-urban setting with and/or adjacent to structures. These parcels include: 2.43 acres, south of Campus Drive; 26.42 acres, north of Campus Drive with telecommunications tower ROW; 4.36 acres, west side of US-41 with Pay Office; .47 acres, between Campus Drive and Hardscrabble Road. This FMP will address the 104-acre parcel for Wildland fire purposes.

A vegetation map (Figure 3) approximates the vegetation cover on the land. Location of wetlands is shown in Figure 4, but current ground work indicates additional wet ground in part created by road grades.

Climate

The Keweenaw Peninsula has a continental temperate climate with warm summers and cold winters. Temperatures are moderated by the proximity of the Lacustrine influence Great Lakes. The mean daily temperatures are 18° F for January, 40° F for April, 64° F for July, and 48° F for October (National Weather Service, data for Houghton County).

The average annual precipitation is about 40 inches. Much of that comes from the high average annual snowfall, which exceeds 200 inches; snow cover lasts about 150 days. This is largely the result of moisture-laden weather systems coming off of Lake Superior. Except for air masses from the southwest, all air masses pass over Lake Superior before reaching FMU 1, resulting in a relatively long, cool growing season.

Figure 3: Vegetation of Wildland Parcel in FMU 1

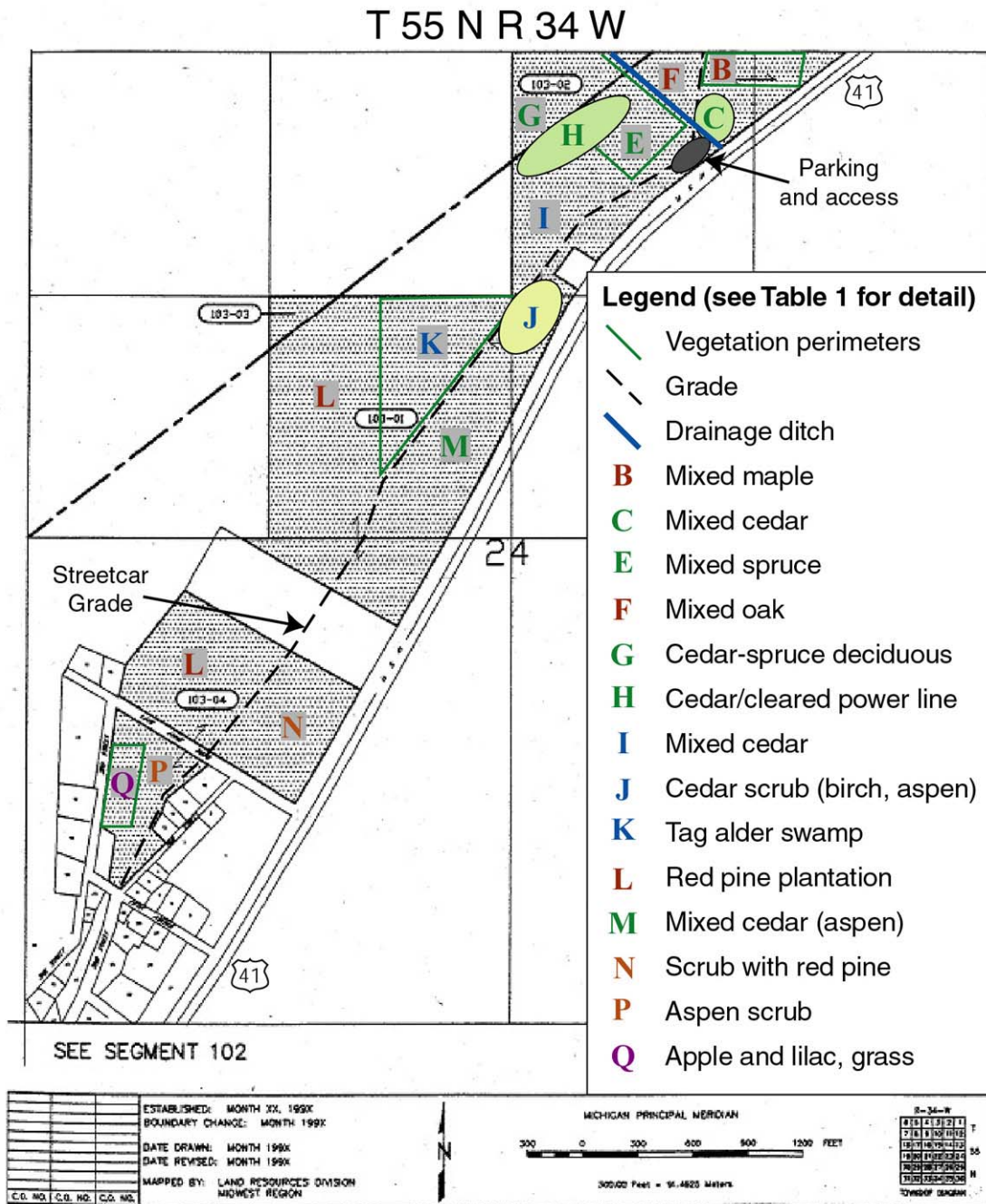


Figure 4: Topography of Wildland Parcel in FMU 1



Geology and soils

Soils are mostly Net-Witbeck complex with other complexes consisting of Trimountain, Paavola, Waiska, and Michigamme, overlying basalt and andesite lava flows interbedded with conglomerates. Soils are generally deep and poorly drained with some moderately well-drained areas. Although the surface has good permeability and consists of organic material, subsoil layers are either firmly packed or retain a high, perched water table. Sandy loam comprises most of the subsoil, but different consistencies dictate varying drainage and water capacity. These soils can support forest cover, but the high water table can lead to shallow root structure and to windthrow problems. These soils are susceptible to damage from vehicles, when they are water saturated.

Water resources and wetlands

Although wetlands occur on the northeast portion of the 104-acre parcel and an ephemeral stream runs through this portion (Figure 4), no major water bodies or 100- or 500-year floodplain exist on the FMU. All identified wetlands are palustrine type, open water or saturated surface wetlands dominated by trees, shrubs, or emergent vegetation.

Fauna and habitat

Wildlife species have not been inventoried in the FMU. Species that have been identified in Houghton County and are likely to occur in the FMU may include: white-tailed deer (*Odocoileus virginianus*); black bear (*Ursus americanus*); Common porcupine (*Erethizon dorsatum*); Coyote (*Canis latrans*); Red fox (*Vulpes vulpes*); Raccoon (*Procyon lotor*); possibly up to six (6) species of weasel; probably four (4) species of shrew; possibly the star-nosed mole (*Condylura cristata*); possibly seven (7) species of bat with three year-round residents: Little brown bat (*Myotis lucifugus*), Northern myotis (*Myotis septentrionalis*), and Big brown bat (*Eptesicus fuscus*), which utilize the Quincy Mines for hibernacula; Eastern cottontail rabbit (*Sylvilagus floridanus*) in addition to the Snowshoe hare (*Lepus americanus*); probably six (6) squirrel species; probably five (5) species of mice, vole, lemming, or jumping mouse; Gray wolf (*Canis lupus*), Moose (*Alces alces*), and Bobcat (*Lynx rufus*) may range into FMU 1 as may the Mountain lion (*Puma concolor*), but are unlikely residents and probably rare visitors; hawks (*Accipiter* spp. and *Buteo* spp.), and various songbirds, including many neo-tropical migrants.

Rare, threatened, and endangered species

At this time, no federally listed species are known to exist in the park. While the American Bald Eagle (*Haliaeetus leucocephalus*) is known to frequent the area, no nesting sites are known to exist on park lands. One state species of concern, Douglas hawthorn (*Crataegus douglasii*), may occur on site, but has not been specifically identified.

Air quality

The Michigan Department of Environmental Quality classifies air quality areas in priorities I and II. Houghton County is not listed in either priority class, indicating that no air quality concerns exist. Air quality is generally good with few sources of pollution within 50 miles of the park. Air pollution sources typical of this area

include paper mills, light industry, and internal combustion engines. Mobile air pollution sources, particularly diesel engines, contribute over 60% of the pollutants. Most pollution is from particulates. The county is ranked among the cleanest 20% of counties in the country in terms of hazardous air pollution that can cause cancer in humans (www.scorecard.org, based on EPA data).

Vegetation

The vegetation of the treatment area consists of highly disturbed community with natural succession reclaiming cleared land and some that was once residential. A red pine (*Pinus resinosa*) plantation with trees of approximately 30 - 40 feet height exists on the west side of the parcel and is planted according to traditional methods for timber production. The remaining cover consists of white cedar (*Thuja occidentalis*), a few black spruce (*Picea mariana*), and mixed deciduous trees (Figure 3, Table 1). Some open-grown oaks (*Quercus rubra*, *Quercus spp.*) are surrounded by small hardwoods. Sugar maple (*Acer saccharum*) are succeeding under quaking aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*) in many locations. The road and streetcar grades behave as dams, retaining water between grade and US Highway-41. Moist soils exclude some hardwood species at many locations and white cedar, scrub trees, and in some cases, red osier dogwood (*Cornus stolonifera*) dominate the cover. Tag alder (*Alnus rugosa*) persists in one wet area of approximately ten acres near the middle of the parcel. The vegetation is generally not fire-dependent, with the exception of the few open grown oaks.

Table 1: Description of General Vegetation Types

Veg. Type	Description
B	Mid-story saplings under mixed maple/hardwood of 6-12" DBH, few small fir
C	Cedar interspersed throughout wet area, sparse
E	Spruce (about 40 ft. height) among mixed deciduous
F	Mixed oak forest with some open grown oaks, small American elm and sugar maple beneath
G	Cedar with evenly mixed spruce, oak, maple
H	Cedar along power line right-of-way clearing (power line cleared 30-50 meters wide)
I	Cedar with mixed deciduous
J	Cedar with scrub paper birch, aspen with some red osier dogwood on south
K	Tag alder swamp with aspen on uplands
L	Red pine plantation (20 years + or – and 30-40 feet)
M	Cedar mix with aspen
N	Scrub wood and 20 foot red pine
P	Aspen scrub
Q	Old home site with apple trees and lilac bushes in grass ground cover

Grades without culverts act as dams throughout area, creating standing water. A drainage-ditch flows to the northwest between stands E and F.

Archaeology

No archaeological surveys have been conducted on this parcel. Three remnants of buildings remain in the southern portion of the property (Figure 4).

Foundations/ruins on NPS lands within the Quincy Unit include the Franklin School (c. 1900-1960), No. 2 Dry House, company-built homes, and the bathhouse. The remains consist mainly of stone and brick foundations with pieces of old construction-lumber scattered in the vicinities. Material archaeology associated with residential areas and light industry is likely on site, particularly in the vicinity of foundations. Materials consistent with an urban setting and located within the top two inches of soil horizon would be susceptible to heat damage if intense fire burned at the soil surface. These materials may include glass, metal, and clay artifacts of the period of significance. They may lie at the surface or just below the soil surface. Foundations and the soil surface around the foundations are considered archaeologically sensitive areas (Jeff Richner, personal communication).

The Houghton County Traction Company trolley grade runs parallel to Highway US-41 for most of the length of the property. The original grade meets other road grades in the northern section of the parcel and continuity of the original grade becomes lost to casual observation.

Visitor experience

The park does not currently promote or encourage visitation in the newly acquired Quincy Unit parcel. No interpretive programs are specific to the parcel. The parcel was purchased to encourage landscape compatible with the desired views of the Quincy area, as seen from the south side of the Portage Canal and along Hwy US-41. The park wished to promote a setting without modern development and to avoid disturbance to the aesthetics of the hill top in the vicinity of the Quincy Mine.

Ethnography

The Quincy Unit has been greatly altered from its pre-settlement landscape and uses. The area, as with most of the Keweenaw, had been timbered and mining communities dotted the land. The Quincy Unit does not appear to have great cultural significance to traditional people of the area. The unit became a center of culture for immigrant people from mining traditions in Europe

a. Strategic and measurable objectives for fire management

- Ensure all wildland fire and prescribed fire operations cause no injuries to the public and limit injuries to firefighters.
- Contain 95% of wildland fires at less than 10 acres in size, wherever suppression will not result in compromising public and firefighter safety or fire suppression damage that would exceed potential fire damage.
- Use prescribed fire (brush pile burning) where and when appropriate as a tool to meet resource management objectives consistent with NPS policies.
- Integrate fire management with all other aspects of park management.
- Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities, particularly the Quincy-Franklin-Hancock Townships Fire Department .
- Conduct one hundred percent of all prescribed burns (brush pile burns) consistent with all Federal, State, and local smoke management requirements. Ensure air quality thresholds for National Ambient Air Quality Standards are not exceeded and visual quality is not reduced in adjacent air sheds due to fire use activities.
- Reduce hazard fuels to protect adjacent cultural and historic values. Mechanical hazard fuel reduction will be applied around vulnerable natural and cultural values for protection from fire damage.
- Apply mechanical hazard fuel reduction to borders of the FMU to create a fuel buffer and eliminate hot spots, such as brush piles.
- Ensure fire does not destroy any historic structure, nor incur costly damage (rehabilitation costs greater than \$15,000) to any cultural or historic edifice or cultural landscape.

- Ensure that wildland and prescribed fires do not escape the park and cause damage to adjacent facilities.
- Develop management goals for the federally owned land in the Quincy Unit and coordinate fire management with all other areas of park management. Determine the desired future conditions for vegetation cover. Incorporate hazard fuel management with vegetation management.
- Assess the condition of the resources and select best management practices to achieve desired results. Monitor the impacts of fire management on resources and against desired goals.

b. Management constraints

- No bulldozer or grader use will be allowed unless approved by park superintendent.
- Park superintendent must approve all use of mechanical equipment

c. FMU 1 Historic Role of Fire

Fire has been a part of each Great Lakes ecosystem since the Holocene Epoch, although the periodicity of its occurrence varies by several orders of magnitude according to regional and landscape ecosystem (Dickman and Cleland, draft). During the pre-Columbian time period, both lightning and human-ignited fire occurred (Pyne 1982), but they were very uncommon in mesic northern hardwood forests (USDA Forest Service 1981). Indigenous people burned for a variety of reasons including: to clear areas for agriculture, to drive game, for communication, to maintain open hunting areas, to stimulate browse, to stimulate fruiting, to maintain open travel routes, for warfare, and to protect their encampments from wildfire (Williams 2000). The pre-Columbian period occurred in conjunction with a period of warm, dry climate, AD 700-1200, when fire was very common.

Fire is a key ecological process in the development and maintenance of grasslands, oak savannas, and oak and oak-pine woodland communities (Pyne 1982). Topography, soil moisture, and fire frequency were primary determinants of pre-European northern forest composition. Conditions within this FMU are similar to conditions in the Sylvania Tract (Ottawa National Forest, Iron County, Michigan), the Porcupine Mountains (Porcupine Mountains State Park, Ontonagon County, Michigan), and the Huron Mountains (Baraga and Marquette Counties) and so would have had similar forests. Forest types in these tracts have been categorized by Dickman and Cleland as

FR4 – mesic northern hardwood and hardwood-hemlock landscape ecosystems historically experiencing very infrequent stand-replacing or community maintenance fires.

The wetland area within this FMU is characteristic of FR4W.

FR4W – wetland landscape ecosystems historically experiencing very infrequent stand-replacing or community maintenance (ground) fires that were embedded within or adjacent to fire-resistant, hence fire protected landscape ecosystems (FR4). The dominant pre-European forest types were wetland hardwoods and mixed hardwood conifer forests including white cedar, hemlock, tamarack, black and green ash, silver maple, and elm.

This determination is based on current observation. No specific and detailed records of forest composition exist for the precise location of this FMU, although a vegetation map of the area identifies forest composition by landform: bedrock ridges – red pine, white pine, red oak, paper birch; bedrock valleys and till – northern hardwood forests (sugar maple and hemlock); uplands with thin soil – northern white cedar, balsam fir, hemlock, and paper birch; poorly drained soils over bedrock – black spruce, northern white cedar, and tamarack (Albert 1995). Observation of forest types in the northeastern portion of the Keweenaw Peninsula, where human disturbance has been minimal suggests that white pine may historically have been more prevalent than today. This may still support the FR4 historic fire regime, although pines are more representative of the FR3 fire regime.

FR3 – dry-mesic landscape ecosystems historically experiencing relatively infrequent stand-replacing fires at much longer fire rotations than the [other FR] categories. The FR3 category also includes landscape ecosystems underlain by heavier texture soils that would have succeeded to fire-sensitive northern hardwood communities in the absence of fire; however succession was impeded due to proximity to fire-prone ecosystems resulting in forest maintenance ground-fires and infrequent crown-fires. The dominant pre-European forest type for the FR3 category was long-lived mixed white pine-hemlock with minor elements of northern hardwood forests.

Although FR4 is likely the best fit for historical fire regime, for the sake of thorough consideration of all possibilities, Table 2 presents information for both regimes.

Table 2: Historic Fire Regimes of the Upper Great Lakes (based on Dickman and Cleland draft)

Dickman and Cleland Fire Regime	Historical Fire Season	Historical Fire Frequency	Typical Intensity	Historical Fire Type	Historical Burn Severity
FR3	Late summer and fall (drought)	150-350 years	High	Ground (crown)	Stand replacing
FR4	Late summer and fall (drought)	350-1000 years	Moderate	Surface (crown)	Stand replacing
FR4W	Drought	>1000 (2000-6000) years	Moderate	Ground (crown)	Stand replacing

Each of these regimes resulted in fire behavior that moved from surface (burning only surface fuels) or ground (burning organic matter in soil layer) to crown when catastrophic windthrow damage created ladder fuels and heavy fuel loads. Windthrow is common in soils of the type in FMU 1. Catastrophic wind events were often the pre-cursor to fire-cycles in northern hardwood regimes.

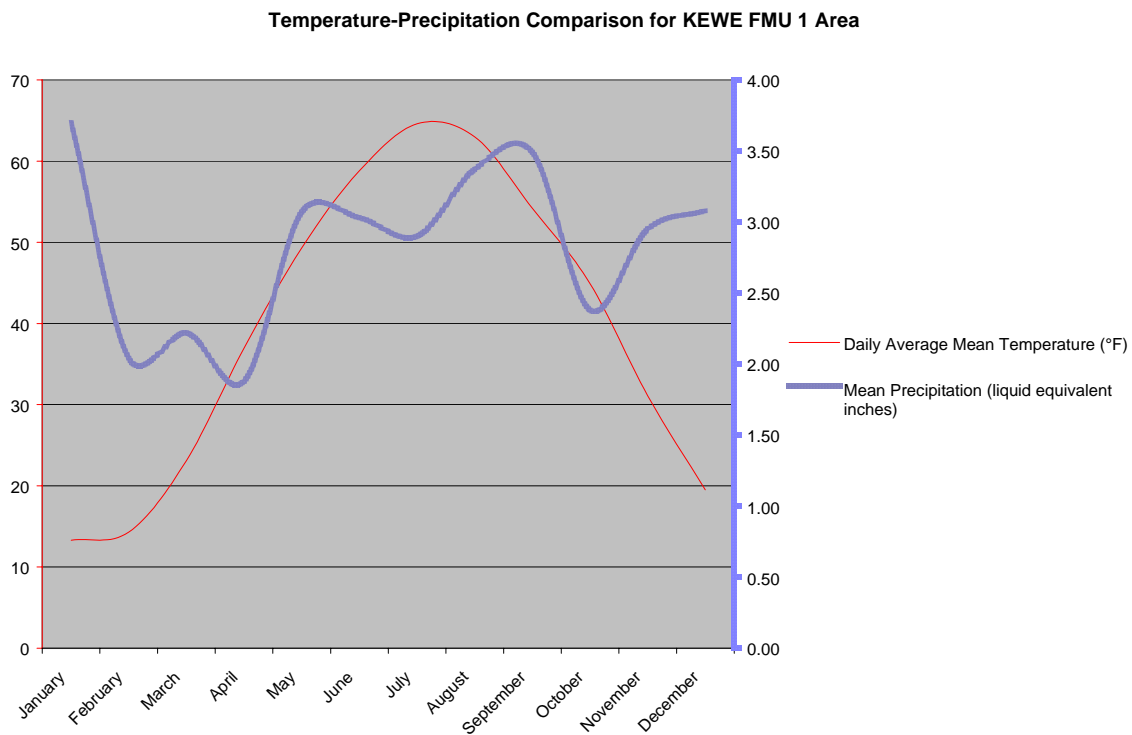
Fire cycles of long duration characterize the northern wetland communities associated with the FR3 and FR4 regimes. These wetlands can be aspen-birch or tree and shrub dominated. In normal years, wetland communities provide fire breaks, because of the high moisture content of their organic soils. They may burn in extremely dry summers and autumns and may result in damage from ground, surface, and crown fire.

d. *Wildland fire management situation*

Historical weather

Climate for FMU 1 is categorized as northern temperate with an average growing season between frosts of 132 days. Precipitation is fairly consistent over the year with the least precipitation occurring while the snow pack from December and January covers the ground. During times of high temperatures, mean monthly precipitation is adequate to maintain northern hardwoods and associated vegetation (Figure 5).

Figure 5: Daily Average Mean Temperature and Mean Precipitation



Fire season

A true fire season does not exist for this region. The likelihood of fire is greatest any time snow does not cover the ground and there has been a prolonged drought. Generally, these conditions are met in late summer or autumn of drought years (Figure 5). Windthrows from summer storms and autumn leaf fall can contribute to increasing the probability of fire in autumn. Late winter and early spring, during snow melt, are the wettest times of year. Much of the snowfall for this area is lake-effect and may occur even during climatic droughts.

Snow cover, which is generally very complete from November into April, prevents hazard fuel conditions. Spring snow melt tends to run off of the frozen ground rather than into it; personal experience (B. Hoduski) has noted that the U.P. fire season is in the springtime between melt-off and green-up. It is rare, without deep drought, that there are summertime or fall fires in this region.

Fuel characteristics

Thirteen fuel models are commonly used in estimating fire behavior. These fuel models are described in Anderson (1982) and presented in Table 3 with applicable fuel type for the park highlighted. Anderson's fuel models account for characteristics of fuel types, such as size classes, density, horizontal and vertical aspects, and moisture and chemical contents.

Fire Behavior Fuel Model 8 (Model 8) is the predominant fuel type in FMU 1. Fuels consist of mostly live vegetation with a very light understory and very little downed wood. This model, as explained by Anderson (1982), is characterized by a somewhat closed overstory that supports fire in the compact litter layer.

Fuel Model 9 (Model 9) applies to the red pine plantation (vegetation L in Figure 3) and to the mixed oak stand (vegetation F).

Fire behavior is based on multiple factors and features, including vegetation type, that are associated with a site. For this reason, fitting the mixed cedar stands into a Fuel Model requires consideration of how the fire will behave in these locations rather than the species involved. Fuel Model 2 characterizes fire behavior in these stands.

Fuels can dry out during summer months under drought conditions. While summer downdraft thunderstorms can cause windthrows, they occur more frequently as a result of low pressure systems in the fall. Heavy snows and high winds can also bring ladder fuels down, which are the principle source of fuel allowing surface fires to reach into the canopy. Leaf fall in October results in light fuels on the surface.

Table 3: Descriptions of fuel models used in fire behavior – taken from Anderson (1982).

Fuel Model	Typical fuel complex	Fuel loading				Fuel bed depth	Moisture of extinction dead fuels
		1 hr	10 hrs	100 hrs	Live		
		-----Tons/acre-----				Feet	Percent
Grass / grass-dominated							
1	Short grass	0.74	0.00	0.00	0.00	1.0	12
2	Timber (grass and understory)	2.00	1.00	.50	.50	1.0	15
Chaparral / shrub fuels							
5	Brush	1.00	.50	.00	2.00	2.0	20
Timber litter							
8	Closed timber litter	1.50	1.00	2.50	0.00	0.2	30
9	Hardwood litter	2.92	0.41	0.15	0.00	0.2	25

None of the fuel models closely represent the fire behavior expected in the tag alder swamp (vegetation K). These shrubs are not very flammable, because their live fuel moisture content is high. In fact, under normal circumstances, fire would be expected to extinguish when it ran up against a tag alder swamp. Despite these considerations, fire would follow set behavior during droughts and Fuel Model 5 best describes this behavior. The fire would progress through surface fuels, particularly litter caused by shrubs and herbaceous understory. Fires are not intense, because fuels are light and shrubs contain little flammable material.

A small area (less than two acres) of grassland with lilac bushes and apple trees lies on the southwest side of the FMU along the parcel border (vegetation Q). This area fits Fuel Model 1 with fine herbaceous fuels. Fires remain on the surface and move quickly through the porous fuels. Fires are not intense and flame lengths are low.

Alteration in fire regime

The immediate area around FMU 1 has probably seen very little alteration in fire regime, despite the large disturbances in the form of landclearing and mining. This is an area that would have rarely burned naturally, but may have also been burned for clearing by indigenous people if they were working copper. In a regional context, the greatest change in fire regime was historical. Pre-Columbian Great Lakes fire regimes were determined by lightning-caused fires and indigenous people with some localities having frequent fires. The immediate post-Columbian fire regimes were altered by the reduction in indigenous populations caused by the introduction of European diseases. Fewer fires were ignited by indigenous people at this time. The period of European settlement and exploitation resulted in the highest rate of fire ignition in the region. Some fires were small conflagrations caused by settlers fire-clearing their land or other

accidental ignitions. Several fires were catastrophic, consuming over a million acres each. The intensity and frequency of fires during this time was unprecedented and resulted in fire prevention and suppression programs that continue today (Dickman and Cleland). The current suppression activity does not impact the historic fire regime for this FMU, which would have been 350 to 6000 years. The landscape had been nearly completely cleared, an approximation of the effects of a stand-replacing fire, as recently as 75 years ago.

The period of European settlement and exploitation on the Keweenaw (roughly 1840s and later) resulted in clear-cutting of forests in the region. Timbers were used in the mines and to support other construction associated with the copper activities of the turn of the century through the 1920s. Anecdotal information says that during this period, a person could look out the windows of a second floor in Calumet and see Lake Superior to the east and to the west. This suggests that the removal of timber was extensive enough that visibility was unimpeded for 20 miles. Fire was suppressed during this time, although methods were unsophisticated. Structural fire was relatively frequent and devastating, but few significant wildland fires were recorded. The land associated with FMU 1 would have been part of an industrial complex with associated residences. The ground would have been clear of major hazard fuels and fire would have been immediately suppressed. The principle ground cover was grass with the residential areas maintaining a scatter of ornamental or food producing plants.

Control problems and dominant topographic features

Nothing in the landscape would make fire suppression in this FMU significantly problematic. Wetlands and saturated soils in spring time may restrict vehicular access off-road, but vehicles would rarely need to access wetland areas or areas with saturated soils. Consideration must be made of values on site, neighboring property, including an in-holding, and safety along US Highway-41.

Other elements

Protection of human health and safety are the first objective in fire management actions. Secondly, protection of property is paramount in fire management activities. Neighboring properties include residences along the border, and a school and hospital within two miles of the FMU. The proximity of the nearby institutions and the US Highway-41 necessitate the smoke management.

Three historic foundations are located on the FMU and are considered values to be protected. The historic streetcar grade is a prominent feature on site and should be preserved. Apple trees and lilac bushes, characteristic of landscaping around residences during the period of significance, may become cultural landscape values in the future, but they have not been identified as such at this time. Other fire management constraints may be identified as the park inventories resources and determines desired future conditions and management strategies on the FMU.

FMU 2: Calumet Unit federally owned property

a. Physical and biotic characteristics

The Calumet Unit FMU 2 consists of federally owned properties within about 750 acres of land around the community of Calumet, Michigan. The FMU includes administrative structures and associated historic landscape of the Calumet and

Hecla Mining Company (C & H). The surrounding property had been supporting commercial and residential areas of the Village of Red Jacket. These buildings have been incorporated into the Village of Calumet and Calumet Township. Federally owned property includes buildings and surrounding urban lot. This includes the C & H general office building (location of park headquarters), library (Keweenaw History Center), C&H Warehouse #1 (park 3-dimensional museum storage), and Union Building (currently vacant, but planned interpretive center). All buildings are historic structures, dating to the late 1800s, as well as administrative facilities.

b. Strategic and measurable objectives for fire management

The park will facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities. It will coordinate and cooperate with Calumet Township Fire & Rescue, County Sheriff, Michigan State Police, and adjacent landowners to prevent wildland fire on adjacent lands.

- Annually review and modify as necessary agreements with the organizations having an interest in fire management.
- Facilitate training and encourage the use of Minimum Impact Suppression Tactics (MIST).
- Coordinate and cooperate with Calumet Township Fire & Rescue, Houghton County Sheriff, Michigan State Police, and adjacent landowners to prevent wildland fire on adjacent lands.
- Ensure fire operations personnel are briefed on park resources and their potential for damage from fire and suppression actions.
- Ensure that a resource advisor is present on all suppression actions.

Prevention of fire in this setting is by use of traditional urban landscape techniques. Fire in this FMU will be structural and will be suppressed by Calumet Fire Department. Further treatment of this FMU will be implicit in discussions of suppression, incident management, public safety, and protection of sensitive resources. It will not receive treatment in discussion of wildland fire management.

c. Management constraints

No prescribed fire or mechanical fuel reduction will be allowed in this FMU.

d. The historic role of fire – see FMU 1

e. Specifics of wildland fire management situation – no wildland exists in the FMU

IV. Wildland Fire Management Program Components

Each fire management plan is comprised of wildland fire management components that define the wildland fire program.

A. General Implementation Procedures

Implementation of wildland fire management components must be consistent with fire management capabilities and should consider the current and predicted conditions affecting fire behavior. Preplanned decisions based on historical fire behavior indices should be considered to most efficiently aid in Stage I decisions requiring appropriate management response.

All wildland fire will be suppressed on the park using appropriate management response. The limited size, lack of resource inventories, proximity to the surrounding communities, and adjacent land values will preclude wildland fire use.

Appropriate management responses should seek to

- immediately suppress wildland fire throughout the park
- limit fire size and contain it within FMU 1

Moreover, responses should be based on

- public and firefighter safety;
- cost expenditures should be commensurate with values to be protected;
- protection of cultural, historic, and natural resources;
- MIST protocol;
- limiting fire line construction through use of existing barriers such as logging roads, streetcar grade, and cleared utility right-of-ways; and
- preventing fire spread onto private lands.

Defining Implementation Procedures

The Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires. The park has a minimum of trained fire personnel on site, therefore, the superintendent will make the Stage I: Initial Fire Assessment, WFIP, which provides the decision framework for selecting the appropriate management response. Since suppression is the only appropriate response, the requirement for a decision checklist as part of the Stage I analysis is considered to be met.

B. Wildland Fire Suppression

Range of potential fire behavior

Due to a lack of complex topography, fires at the park are essentially wind-driven. Extreme fire behavior occurs during high winds, or during droughts when fuel moistures are low.

In Fuel Model 8, the predominant fuel type in the park, fire progresses through the ground slowly with low flame height. Fuels pose fire hazards only when extreme weather conditions exist.

In Fuel Model 9, the red pine plantation and the mixed oak stand, fire burns more quickly at the surface than in Model 8. Dead-down wood may contribute to torching of trees and crowning.

In Fuel Model 2, the mixed cedar stands, surface fire will spread primarily through the herbaceous material and timber overstory can contribute to the intensity of the fire. Firebrands may occur as clumps of fuel generate high intensities.

In Fuel Model 5, the tag alder swamp, fire would burn only in extreme droughts, The fire would progress through surface fuels, particularly litter caused by shrubs and herbaceous understory. Fires are not intense, because fuels are light and shrubs contain little flammable material.

Preparedness Actions

Prevention Activities

Fire prevention includes all activities designed to reduce the number of human-caused wildfires that occur in the park. The objective of the program will be to minimize preventable fires. Prevention activities will consist of prevention messages through interpreters and staff.

The park does not have interpretive materials associated with the wildland area and staff are not located at the site. Therefore, fire prevention messaging must be done through innovative methods. The park may participate in fire prevention and safety fairs at local schools so that the general public is aware of the importance of fire prevention. The park will provide educational messages through local media that provide wildland fire prevention. The park will involve its partners in fire prevention messaging and in fire danger reporting.

During periods of high fire danger, the general public and visitors will be informed of conditions through press releases and posting of signs at partner sites. Open fire is not permitted in the park under 36 CFR §2.13.

Annual training activities

There are two staff members at the park trained in fire safety or fire fighting although the park is not represented by an Area Fire Management Officer. Fire training activities will be coordinated through the Midwest Region Fire Management Office. Annual training will consist of first aid, and other safety training for appropriate individuals. Basic safety, awareness, and prevention training will occur during staff meetings. Opportunities for firefighter training likely exist with the local land management agencies. If park staff is wishing to receive firefighter training or maintain firefighting qualifications, they should contact the MWR Fire Management Office.

Annual readiness preparation

January

- Should the park choose to incorporate the staff in fire activities, physicals and testing would be done at this time under the coordination of the MWR FMO.

- Update and submit fire qualifications to the Interagency Qualification and Certification System (IQCS) database through the MWR FMO, when appropriate.

February

- Complete or review all Prescribed Fire Plans for upcoming season and have approved by park superintendent.
- Prepare briefing messages for public notification.
- Review Step-up Plan and emergency preparedness account need or status.
- Discuss fire prevention activities at a selected staff safety meeting to make sure all members are aware of concerns and procedures regarding response to wildland fires and actions related to prescribed and wildland fires.

April through September

- Remain vigilant of potential fire hazards and implement fire prevention. Note the weather conditions and predictions about drought. Monitor daily fire potential.

November and December

- Review cooperative agreement with Quincy-Franklin-Hancock Townships Fire Department
- Review and revise FMP, if necessary.

Fire weather and fire danger

Weather forecast monitoring must begin seven (7) days prior to planned fire activities. Sources for this information include:

- The Daily National Situation Report can be found at <http://www.nifc.gov/news/sitreprt.pdf> and provides information on current fires across the nation.
- Michigan Department of Natural Resources, information on Fire Management for the state is located at http://www.michigan.gov/dnr/0,1607,7-153-10367_11851---,00.html with links to other fire related web sites.
- The site for fire rating thresholds is <http://www.dnr.state.mi.us/www/fmd/weather/updanger.htm>

The Pelkie Daily Danger Record is found at

<http://www.dnr.state.mi.us/www/fmd/weather/Tables/Peldaily.txt>

The Pelkie Hourly Graph is found at

<http://www.dnr.state.mi.us/www/fmd/weather/images/pelhourly.gif>

The Pelkie Season Graph is found at:

<http://www.dnr.state.mi.us/www/fmd/weather/images/pelkie.gif>

- The National Weather Service (NWS), Marquette Weather Forecast Office, 112 Airpark Drive South, Negaunee, MI 49866 provides weather information for the region. Verbal zone forecasts for Houghton County are available by NOAA weather radio broadcast from Painesdale and web based forecasts, severe weather outlooks, climate data, and links to satellite and radar imagery, and fire weather can be selected at <http://www.crh.noaa.gov/mqt/>. Weather

products are based on data from the Hancock Regional Airport (35°-20'-01"N; 094°-21'-54"W; 140M) near the Quincy Unit.

- Open burning permits are issued by the Department of Natural Resources, by calling 1-800-838-1587. Burn ban information may be obtained from the Baraga District Office at 906-353-6651.
- County weather forecast web site is found at <http://www.crh.noaa.gov/data/forecasts/MIZ003.php?warncounty=MIC061&city=Hancock> and provides current conditions, forecasts, and hazardous weather outlook.

On-site weather should also be taken prior to prescribed fire ignition to confirm current conditions.

The Palmer Drought Index measures the moisture supply at specific locations. This index uses a water balance equation that accounts for precipitation, temperature, and soil moisture. Palmer Drought Index data can be found at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif, which may be accessed from the Michigan Department of Natural Resources fire management page, http://www.michigan.gov/dnr/0,1607,7-153-10367_11851---,00.html.

Step-up staffing plan

Preparedness activities during the fire season will be based on the outputs from the Fire Danger Maps, a product of the Wildland Fire Assessment System, found at <http://www.fs.fed.us/land/wfas>. The assessments are based on the NFDRS. Fire danger is broadly divided into five staffing classes, according to the intensity of danger factors, as indicated by the Adjective Rating or Level.

The staffing classes relate to the expected severity of fire conditions. The park superintendent or MWR FMO may choose to increase preparedness-staffing class by one level for unusual events that would increase the potential for wildland fire, such as Lightning Activity Level (LAL) of 4, 5, or 6. Preparedness actions are based on the latest Adjective Rating and the Next Day Forecast.

Table 4. Fire Danger Rating	
Low	I
Moderate	II
High	III
Very High	IV
Extreme	V

The site for fire rating thresholds is <http://www.dnr.state.mi.us/www/fmd/weather/updanger.htm>

The Pelkie Daily Danger Record is: <http://www.dnr.state.mi.us/www/fmd/weather/Tables/Peldaily.txt>

The Pelkie Hourly Graph is: <http://www.dnr.state.mi.us/www/fmd/weather/images/pelhourly.gif>

The Pelkie Season Graph is: <http://www.dnr.state.mi.us/www/fmd/weather/images/pelkie.gif>

Fire conditions that typify each staffing class and the corresponding preparedness actions required are as follows:

Staffing Classes I and II (Low/Moderate)

Funding for preparedness at this level is taken from operating costs.

Conditions

Fires will present at low to moderate level of control difficulty. Fires occurring at this level may be controlled with existing forces. Wind speed and direction will determine speed of fire spread. Fine fuels will be drying.

Preparedness Actions

- Fire weather reviewed daily by the Facility Manager.
- Notify Quincy-Franklin-Hancock Townships Fire Department of preparedness activities.
- Safety equipment made ready.
- Initiate information dissemination to visitors concerning fire safety.
- Review procedures for ensuring visitor safety, should a wildland fire ignite.
- Review notification procedures for assuring that all parties handling traffic control, fire fighting activities, public safety, medical services, and other activities related to dispatch.

Staffing Class III (High)

Funding for preparedness at this level is taken from operating costs.

Conditions

Fires will present a moderate level of control difficulty. Light fuels are becoming dry. Heavy fuels are drying. Mop-up will be more difficult and time-consuming.

Preparedness Actions

- All actions specified for Staffing Class I and II days will be continued.
- Inform and discuss with staff the fire danger at staff meetings or through other frequent and timely means.
- Continue to inform visitors of fire danger and fire safety.

Staffing Classes IV and V (Very High/Extreme)

Funding for preparedness at this level is taken from operating funds with FIREPRO assistance.

Conditions

Fire will present a moderate to high level of control difficulty. Initial attack and reinforcing crews may have difficulty controlling a fire at this level. All fuels are dry. Air temperature is high and humidity is low. Strong gusty winds are possible. Spotting may occur.

Preparedness Actions

- All actions specified for Staffing Class III days will be continued.
- Fire Situation reports will be entered into the NIFC daily before 9:30 A.M.

- Visitor center personnel will alert the public to fire hazards.
- Interpretive activities will include a fire safety message.
- Emergency preparedness funds (PWE E11) may bring staff to required levels. Regularly scheduled personnel will be used to the extent possible and nonessential routine activities and project work may be postponed on Staff Class IV and V days.
- Fire danger notices will be posted.
- Park may have sections closed to preserve the safety of visitors.

3. Pre-attack Plan

Due to the small size and scope of the fire program at the park, no formal pre-attack plan has been written. Certain preparations and procedures are established prior to and during the fire season. Some are mentioned in the Annual Preparedness Activities section, other pre-attack plans will be informally discussed among the staff at a meeting in early summer annually. Fire safety will be presented at staff meetings twice per annum. Operating procedures for evacuating visitors and ensuring their safety will be reviewed prior to fire season. The park staff will have specific duties assigned as part of an operating procedure.

4. Initial Attack

Initial attack is an aggressive suppression action consistent with firefighter and public safety and values to be protected. Due to the size of this wildland, multiple starts are unlikely. Natural fire breaks around and within the FMU and the expected fire behavior make it unlikely that suppression would go beyond initial attack stage.

Priority setting during multiple fire occurrences

In the unlikely event of multiple fire occurrences The following will be used to set the priorities:

- cultural and historic site map of the parcel
- map displaying park location relative to neighboring properties and city facilities
- map approximating vegetation types, including species of concern, should they be discovered on the FMU

Criteria for appropriate initial attack response consistent with resource management objectives:

- public and firefighter safety;
- protection of cultural, historic, and natural resources;
- protection of improvements and private property;
- minimum fire line construction;
- available suppression resources and response times; and
- fire danger as determined by fuels, weather, and topography.

Mechanized equipment will be used only where necessary to support above-listed criteria. Aircraft will not be deployed in this setting. Confinement strategy selected for initial attack will not be used solely to meet resource management objectives. Resource benefits may be a by-product of strategy, but strategy must be based upon the criteria listed above.

Confinement strategy

Confinement strategy may be selected in the WFSA process when initial attack has failed to contain a wildland fire or to protect public and firefighter safety or resources. Confinement strategy may be implemented as the initial attack action as long as it is not used to meet resource objectives. Confinement is selected to maximize firefighter safety, minimize suppression costs, minimize cost and loss in low valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly valued resource areas.

Confinement can also be a strategic selection through the WFSA process when the fire is expected to exceed initial attack capability or planned management capability. A WFIP will be prepared in stages as the fire management conditions change and associated considerations require additional attention.

Typical fire response times

Typical fire response times will vary depending on the staffing at the park, availability of local fire fighters from the Quincy-Franklin-Hancock Townships Fire Department, and time of day. During fire season when no other fire activity is occurring and staffing is available, staff will respond in 20 minutes to ensure the safety of visitors. Fire department response will be 10 minutes to the closest road access. Reinforcements from outside the area can arrive within 30 minutes after request

Restrictions and special concerns

Initial attack should be aggressive to contain the fire as fast as possible and to keep fires from crossing boundaries and damaging private property. Minimum Impact Suppression Tactics (MIST) will be used in efforts to contain wildland fires. Priority would be given to FMU1 because of proximity to border and city, as well as the cultural resources located there in the event of multiple fires. City police, Houghton County Sheriff Department and Michigan State Police dispatch should be notified of potential road visibility hazards. Due to the small size and nature of the burnable area, plows, bulldozers, explosives, and other techniques associated with large or rural fires will not be employed.

5. Extended Attack and Large Fire Suppression

The size and nature of the site suggests that extended attack is unlikely.

Determining extended attack needs

Extended attack needs will be determined by considering the following:

- threats to life, property, and park resources
- availability of suppression forces
- current and expected fire behavior

Implementation plan requirements - WFSA development

Follow guidance in *Wildland and Prescribed Fire Policy*, Implementation Procedures Reference Guide and RM-18, Chapter 9.

Complexity decision process from initial attack to extended attack

Follow guidance in RM-18, Chapter 9, Initial and Extended Attack.

6. Exceeding existing WFIP – selecting a new strategy

A WFIP may be exceeded when a wildland fire cannot be controlled during the initial suppression response action or where the appropriate management response has not been successful. A WFIP may also be exceeded when the implementation of a prescribed fire is unsuccessful. The WFSA is initiated at this stage. Due to the size and nature of the park wildland and the type of prescribed fire proposed, a fire would exceed WFIP by leaving the NPS property.

Minimum Impact Suppression Tactics (MIST)

All fire management activities will rely on tactics that incur a minimum amount of resource damage while maintaining the safety of firefighters, personnel and the public as the highest priority. The park superintendent approval is needed for mechanized equipment within the FMU. Complete minimum impact guidelines are listed in RM-18, Chapter 9, Exhibit 5.

Rehabilitation

All suppression activities will be carried out in such a manner as to cause the least amount of resource damage. All litter and trash will be removed from the area after the fire is declared extinguished. Dug fire lines will be refilled and erosion control devices installed if necessary. Stumps will be flush cut. Logs and brush will be chopped and scattered or removed. The severity of the burn and its resultant impact will be considered in determining the need to re-establish native plant species. Such efforts regarding landscaping and plants will be in full compliance with NPS Management Policies and given prior approval of the regional director. A rehabilitation plan that will account for cultural resources (archaeological artifacts revealed, ruins and foundations) as well as outline what species are to be planted, techniques to be used, locations and cost estimates will be prepared before any action is taken, according to the guidance in RM-18, Chapter 12, Burned Area Rehabilitation (BAER). The regional fire ecologist is the contact for all BAER funding requests.

Records/Reports

Wildland Fire Implementation Plan

A WFIP will be prepared for every wildland fire and will be the responsibility of the superintendent designee to have completed.

Individual Fire Reports (DI-1202)

The basic report for documenting a wildland fire is the DI-1202. The report is valuable in providing a historical record of the fire regime for the park. It is important that this form document all fires occurring within the boundaries. Further documentation is suggested. This includes fires that go out unassisted when the location is known.

The incident commander for the fire is usually the person responsible for preparation of the DI-1202. In most cases, this is the individual who put the fire out, but this would not apply to the park. The park superintendent will have ultimate responsibility for fire reporting, but will receive assistance from the park's assigned Regional Fire Management Office.

A complete fire report will include the following attachments, if applicable:

- any written policies, guidelines or authority statements signed by the park superintendent
- copy of the WFIP, when appropriate
- copies of equipment purchased or personnel request orders, when appropriate
- all situation maps
- personnel lists (including Emergency Time slips)
- press clippings
- accident reports
- all weather data reports and records
- documentation of financial charges
- rehabilitation plan

Instructions for filling out the report are found in RM-18. The superintendent is ultimately responsible for these data being entered into the park database for a permanent record. This procedure also prepares a final draft of the form for the files. The information will be entered into the Shared Application Computer Software (SACS), accessible through the Internet via the NIFC homepage. A copy of the DI-1202 will be accessible in the NIFC computer.

Fire Experience and Qualifications

The IQCS is the central repository for all individual fire experience and training records. IQCS is the database for recording fire experience and qualifications for personnel.

Daily Situation Reports

Daily Situation Reports are required on those days when the Fire Danger Rating is Very High and the park moves into Staging Class IV and V or when a fire has occurred or is ongoing. The Superintendent, or designated personnel as assigned, is responsible for the preparation of the report and entering it into SACS by 9:30 a.m.

Smoke Management Reports

Smoke management reports are not required by the state of Michigan.

Report of Fire

When a report of a fire is received, the following information should be collected from the reporting party:

- name of reporting party
- address
- phone number
- location of fire and extent.

If fire is reported in person, ask if the reporting party is willing to show the investigator the location, otherwise, determine if the person can be re-contacted if there are additional questions.

Resource Order Form, NFES 1470

All assistance requests must be documented on the Resource Order Form, NFES 1470. These forms are designed for verbal transmission over the

telephone. The order form is, in essence, an obligating procurement document. If an out-of-park incident management team is ordered, the park superintendent must provide a written limited delegation of authority and a briefing package to the incoming incident commander.

Year-end Accomplishment

Completion of year-end accomplishment reports is the responsibility of the MWR FMO.

C. Wildland Fire Use

Wildland Fire Use is a strategy of managing naturally (lightning) ignited wildland fires for resource benefits. Keweenaw NHP will not employ a Wildland Fire Use program due to its small size and the nature of its management goals.

D. Prescribed Fire Management

Planning and execution of this prescribed fire management program will use qualified personnel and will follow the guidelines stated in document RM-18. Refer to RM-18 for guidance on all aspects related to implementing this prescribed fire program.

1. Prescribed fire planning and documentation

The Prescribed Fire Plan is the site-specific implementation document defining the strategic purpose, goals and objectives for the project. The Prescribed Fire Plan provides guidance for developing an Incident Action Plan (IAP) defining tactical activities for each operational period needed to execute the prescribed fire project. A Prescribed Fire Plan is required for prescribed fire projects, but only one encompassing plan will be needed to cover multiple occurrences of debris burning at the park. All Prescribed Fire Plans must be reviewed and recommended by a burn boss qualified at or above the complexity level of the project.

The park superintendent, as agency administrator, has final approval authority for the Prescribed Fire Plan and shall ensure the plan receives sufficient oversight, guidance and support. As part of the responsibility for approval of the Prescribed Fire Plan the agency administrator is responsible for ensuring that the Prescribed Fire Plan is closely linked to and consistent with the fire management plan and NPS direction and policy.

Annual activities needed to implement the Prescribed Fire Program

Early in each fiscal year, the park will review the FMP guidance and recommendations of the Great Lakes Fire Ecologist to determine whether hazard mitigation will be met by prescribed techniques. If the decision is to use fire for debris disposal, then a Prescribed Fire Plan will be written by a qualified Burn Boss and reviewed by the FMO or the existing plan will be reviewed and updated. The park superintendent must approve Prescribed Fire Plans prior to burn ignition.

Construction of perimeter fire control lines is discouraged due to impacts to resources. The use of mowed fuel breaks for reinforcing perimeter control lines is encouraged. Interior control lines and mechanical fuel treatments may be necessary to protect sensitive features within the FMU. Attention should be

given to known historical foundations and landscape features, including plantings.

Long-term strategies

The park does not intend to use fire as a treatment for landscape and hazard mitigation. Mechanically cut debris will be burned as needed to mitigate fire hazards.

Personnel needed to plan and execute the Prescribed Fire Program

Planning and execution of this prescribed fire management program will use qualified personnel and will follow the guidelines stated in document RM-18, Chapter 10.

The park currently does not have qualified staffing to implement prescribed fire. The MWR FMO, other qualified prescribed fire planners and practitioners, and local fire department must be relied upon for assistance in planning and implementing debris disposal using fire.

Prescribed fire priority area

No prescribed fire will be used outside of burn piles.

Prescribed fire behavior

No prescribed fire will be used outside of burn piles. Fire intensity in burn piles will be kept to moderate levels to minimize scorching soil.

Prescribed fire monitoring

Classic fire monitoring does not apply to this situation. Spot monitoring could include measurement of organic constituents in the top 10 centimeters of soil before and after fire under the burn piles. Vegetation recovery at burn piles should be assessed to determine how frequently burn piles can be ignited at specific locations without impacting resources.

Prescribed fire critique format

There are no requirements for prescribed fire critiques. However, it is recommended that a critique be completed annually and/or for any prescribed fire with significant problems (escapes, failure to meet objectives, accidents and/or near misses, etc.). Escape of fire from a burn pile may necessitate such critique.

When conducting a critique, representatives of all resources will be invited. An outline of critique topics will be provided to all participants prior to the critique. The critique will focus on identification of problems and not persons. It will include the following elements:

- Did the Prescribed Fire Plan follow policy?
- Was the Prescribed Fire Plan implemented correctly (were any prescriptive elements violated)?
- Were Prescribed Fire Plan objectives met?
- Were all personnel qualified to perform the tasks assigned to them?
- Were any accidents caused by failure to follow policy?
- Solicit suggestions for improvements to planning and implementation of future prescribed burns.

Escaped prescribed fires

Information that should be used to set incident priorities:

- objectives involved in the fire;
- restrictions in areas of special concern;
- implementation plan requirements;
- social and political concerns;
- decision criteria matrix or flowchart including risk assessment; and
- complexity decision process for transition from initial attack to extended action

Documentation requirements

See RM-18 Chapter 10, Prescribed Fire Plan Section.

Historic fuel treatment activities

No past activities are known to affect prescribed fire planning at this time. Mechanical and manual fuel mitigation may be done annually. Most landscape activities and fuel mitigation are responsive activities and are not pre-planned at this time.

Local Prescribed Fire Plan requirements

Local Prescribed Fire Plans follow the format established in RM-18 with little deviation. A description of the required Prescribed Fire Plan elements can be found in Chapter 10, RM-18.

The plan must address the following considerations:

- technical review
- collaborative planning and review
- prescribed fire project plan contents, including signature page, executive summary, description of prescribed fire area, fuel characteristics, vicinity maps, and project maps
- goals and objectives
- risk management
- project complexity
- organization
- cost
- scheduling
- pre-burn considerations
- prescription
- ignition and holding actions
- wildland fire transition plan
- protection of sensitive features
- public and firefighter safety
- smoke management
- interagency coordination and public information
- monitoring
- post fire rehabilitation
- post fire reports

2. Exceeding existing Prescribed Fire Plan

When burn prescription parameters are exceeded during ignition, containment actions must be taken. If the burn is declared an "escaped fire," then a WFSA must be completed and the appropriate management response will be utilized. Spot fires may not constitute an escape if they are contained within standards that are identified in the Prescribed Fire Plan. Follow RM 18, Chapter 9, to develop a WFSA.

Priorities for action if a fire requires a new strategy should be based first on safety of the public and firefighters. Secondary priorities include protection of private property and park resources and improvements. The park Safety Officer should identify safety hazards.

The following maps will be available to burn bosses for setting priorities in the event a prescribed fire escapes:

- map(s) of the township(s), showing the proximity of privately owned buildings
- facility map
- topographic map
- vegetation map

Incident action plan or the Prescribed Fire Plan provides guidance to develop organization. Strategy and tactics that have been successful in the past will be given priority. MIST will be utilized as appropriate considering safety and values at risk. In addition to life, property, and resource concerns, there is a high degree of public concern with regard to the abilities of the NPS (and other federal agencies) to control fire use actions. Consequently, it is critical to bring escaped prescribed fires back under control as quickly as possible.

Air quality and smoke management

One potential source of controversy for prescribed fires is smoke, as all fires produce airborne particles that contribute to material normally found in the atmosphere. With prescribed fire, the time and place can be chosen so that fuel characteristics, atmospheric moisture, velocity and direction of wind, and other weather conditions will cause a minimal impact on nearby communities. As has been stated before, a fire management activity must consider the impact of smoke on the city of Hancock and its immediate and potentially dangerous impact on visibility along US Highway-41.

The fire management program at the park will seek to minimize adverse environmental effects and will comply with State air quality provisions and permit requirements in addition to applicable provisions of the Clean Air Act (P.L. 88-206) and related federal regulations. The state of Michigan enforces regulations concerning open burning. Tree, log, brush, and stump burning is allowed under permit, if consistent with local ordinance and not conducted within a priority I or II area (Natural Resources and Environmental Protection Act, 1994, PA 451, R336.1331, R336.1310). Burning cannot be closer than 1400 feet to an incorporated city or village limit. Burning is allowed without permit any time the ground is snow covered, and is permitted by the Department of Natural Resources

at other times, unless extreme conditions exist (Open Burning Regulations in Appendix D).

The park will adhere to the following smoke management guidelines during all phases of the above program.

- No prescribed fires will be ignited during air pollution alerts, or temperature inversions.
- Fire weather forecasts will be used to predict smoke dispersal upon ignition.
- Burning will be conducted only when conditions will result in rapid smoke dispersal, as reflected in the wind components of the burn prescription.

Smoke will be monitored for effects. The news media will be kept informed on fire conditions and predictions regarding air movements and how they should affect areas surrounding the park. Houghton County Sheriff Department, Hancock City Police, and Michigan State Police dispatch will be notified of intention to ignite as per contact specifications in the contact list (Appendix E).

E. Non-Fire Fuel Treatment Applications

The scope of non-fire fuel treatment activities related to fuel hazard mitigation and the total fire management program includes mechanical treatment. The methods combine manual cutting and/or removal of hazard fuels. Land would be assessed for hazard fuel conditions annually. Laborers with chainsaws and hand tools would remove hazard fuels as needed. Laborers could trim branches from red pine in the plantation to a level of 12 to 15 feet above the ground. Laborers would cut dead limbs and trees in the hardwoods if they posed a hazard. Snags that do not contribute to hazard fuels could be left standing. Dead limbs would be cut from open grown white cedars as needed, although soil moisture and sparse vegetation may reduce the need for treatment. No treatment would occur in the tag alder swamp or cedar swamp. These areas have sparse vegetation on saturated soils with standing water during much of the year. Materials may be chipped for dispersal or composting, distributed in low fuel areas, or placed in burn piles for ignition. Judgment would be made on-the-ground in choosing the method of fuel disposition based on potential for creating hazard fuel conditions. Having this variety of methods to manage hazard fuels allows the park to select the best technique for conditions and adapt techniques to meet the desired conditions. The park should monitor carefully for effects of mechanical treatment. These activities will normally be accomplished using base funding but may also utilize FIREPRO funding when appropriate and available.

F. Emergency Rehabilitation and Restoration

The *Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook* will provide guidelines for rehabilitation efforts on the FMU, in the event of severe wildland fire damage. The regional fire ecologist coordinates all Rehabilitation requests.

V. Organizational and Budgetary Parameters

A. Organizational Structure of Park Fire Management Program

The park does not have a fire management organization. The regional FMO provides oversight and assistance as needed. The Facility Manager will evaluate the management needs for the season and report their findings to the park Superintendent.

Figure 5: Keweenaw NHP Fire Organization for 2004

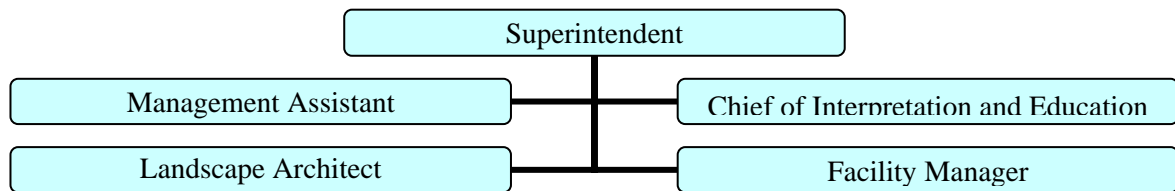
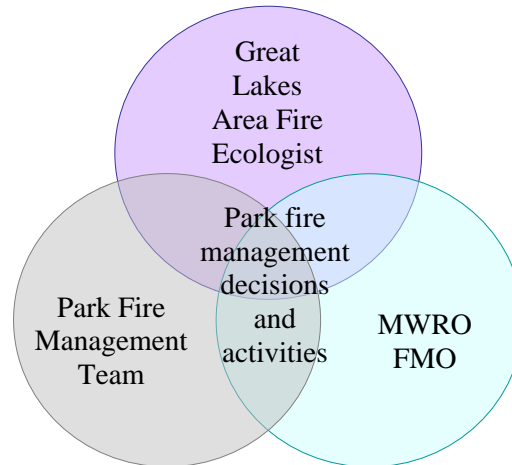


Figure 6: FIREPRO Organization and input into park fire activities



Individual roles and responsibilities for the Keweenaw NHP Fire Management Program

Park Superintendent:

- Responsible for overall operation and management of the park, ensures that Department, Service and park policies are maintained and followed.

- Secures support from FMO and FIREPRO to meet the objectives of the park's Fire Management Program.
- Responsible for overall fire prevention within the park.
- Approves decisions relative to suppression activities.
- Signs Agency Administrator Go/No Go checklist for each prescribed fire.
- Signs verification forms for fuel management activities.
- Ensures that all park divisions support the team effort to maintain a fire management program.
- Approves Fire Management Plan and all Prescribed Fire Plans.
- Supports the fire program by making personnel available for park fire operations, out-of-park fire assignments, and fire training to the extent possible.
- Responsible for implementation of the Fire Management Plan.

Management Assistant (with assistance as needed from qualified ISRO staff):

- Provides oversight for the park Fire Management Program as part of the resource management program.
- Is a member of the Fire Management Team
- In coordination with the MWR FMO, ensures that the fire management program complements resource management objectives and complies with NPS and interagency fire policy.
- Provides general oversight for monitoring and research programs designed to evaluate fire effects on resources.
- Coordinates park responsibilities in environmental compliance process for fire-related activities.
- Serves as park liaison with the FIREPRO fire monitors and Fire Ecologist to ensure fire effects-monitoring is integrated as appropriate with the NPS Inventory and Monitoring Program.
- Ensures fire suppression activities are integrated with other emergency operations (law enforcement, search and rescue, structural fire protection) in the park.
- Responsible for day-to-day fire program operations and implementation.
- Ensures fire preparedness.
- Ensures all documentation for park fires (including DI-1202 reports) is completed and provided to MWR FMO for input into the national database; ensures fire spatial data is input to the park's relational (GIS) database.
- Coordinates with the MWR FMO and Keweenaw NHP staff to plan and implement prescribed fires as allowed under the Fire Management Plan.

Chief of Interpretation and Education

- Incorporates fire management information into interpretive programs, when appropriate.

- Provides fire information to park staff and visitors.
- Ensures that accurate information is incorporated into park books, brochures, and exhibits.
- Provides for on-site interpretation of fires when appropriate and safe.
- May serve as Fire Information Officer, as appropriate.
- Is a member of the Fire management Team.
- Supports the fire program by making personnel available for park fire operations to the extent possible.
- Updates Fire Prevention Plan as needed.

Landscape Architect:

- Cooperatively works with the facility manager to determine techniques and best management practices to attain objectives of landscape management and hazard fuel mitigation.
- Ensures that all facility maps are up to date with the latest information on vegetation and potential problem areas for fire suppression with access points indicated.
- Ensures that appropriate fire management activities are incorporated into the park's GIS database.
- Is a member of Fire Management Team.

Facility Manager:

- Cooperatively works with the landscape architect to determine techniques and best management practices to attain objectives of landscape management and hazard fuel mitigation.
- Is a member of Fire Management Team.
- Supports the fire program by making personnel available for park fire operations to the extent possible.
- Coordinates preparation and implementation of fuels treatment projects.

Fire Management Team:

This team consists of the park superintendent, management assistant, chief of interpretation and education, landscape architect, and facility manager. The park superintendent may, at his/her discretion, designate other personnel to serve on the Fire Management Team.

- Meet at least once between fire seasons to review fire operations, identify problems/issues, and make recommendations for changes at the park or MWR FMO as needed to improve the program.
- Review the Fire Management Plan, making revisions as necessary.
- May be convened by the park superintendent whenever fire and/or weather conditions present a serious threat to park facilities or resources, or neighboring property, to evaluate fire potential, weather and management concerns; determine an appropriate course of action, using the Fire Management Plan and other resource management plans as guidelines.

Administrative Officer:

- Provides overall administrative support for the fire management program.
- Supports the fire program by making personnel available for park fire operations to the extent possible.

Regional Fire Management Officer (FMO):

- Responsible for overall effectiveness of the Fire Management Program.
- Coordinates fire management activities providing technical assistance and advice to parks as needed. Reviews and advises the park superintendent on requests for fire assistance, operational activities required for the implementation of this Fire Management Plan, and completeness and correctness of all final fire reports.
- Nominates personnel to receive fire-related training and refresher training as appropriate.
- Develops and implements cooperative fire management agreements with other federal and state agencies.
- Coordinates, prioritizes, and submits all FIREPRO funding requests for fire program activities. Reviews all Prescribed Fire Plans and Fire Reports (DI-1202).
- Approves Redcards and Task books (certifies).
- Serves as Safety Officer for the Fire Management Program.
- Coordinates Fire Preparedness Reviews and site reviews.
- In cooperation with the park, develops short and long-range plans.
- Responsible for coordinating development of Prescribed Fire Plans.
- Makes entries into NFPORS database for fuels treatment planning.
- Maintains records for all personnel involved in suppression and prescribed fire activities.
- Updates all fire qualifications for entry into the IOCS.

Great Lakes Fire Ecologist:

- Coordinates fire-related research.
- Provides technical support and fire ecology information to park.
- Assists with writing various management plans and compliance documents; helps ensure ecological implications of fire are included in all park planning.

B. FIREPRO (NPS fire program) funding

Currently, all FIREPRO funding for the park is managed by the FMO. No fire activities have occurred to date.

C. Fire Management Organization in Relation to Park Organization

The facility manager is responsible for coordinating the fire management program under the direction of the superintendent. This entails coordinating with area and regional FMO on fire management objectives, and all prescribed and wildland fire

implementation actions. The park superintendent gives final approval for Prescribed Fire Plans and other actions as outlined within this FMP.

D. Park Superintendent's Responsibility for Periodic Assessment Signature

Given that Wildland Fire Use is not a management strategy at the park, there is no need for the superintendent to sign periodic assessments for continued wildland fire use.

E. Interagency Coordination

Interagency coordination and cooperation is essential for successful implementation of the fire management program at the park. All wildland fires will require external support by cooperators. Annual review of cooperative agreements (Appendix E) will ensure successful coordination.

F. Key Interagency Contacts

Table 5: Interagency contacts and phone numbers

Name	Contact	Activity
Michigan Department of Natural Resources	1-800-838-1587	<ul style="list-style-type: none"> • Issue burn permit
MI-DNR	Baraga District Office 906-353-6651	<ul style="list-style-type: none"> • Consult on hazard mitigation • Status of fire bans
Houghton County Sheriff's Office	Phone: 906-482-0055 Fax: 906-487-5949 403 E .Houghton Ave. Houghton, MI 49931	<ul style="list-style-type: none"> • Coordinate traffic safety associated with US highway. • Assist with other traffic issues as necessary.
Michigan State Police	55195 US Highway-41 Calumet, MI 49913 Phone: 906-337-5145 Fax: 906-337-9955	<ul style="list-style-type: none"> • Assist with traffic safety and control as necessary.
Quincy-Franklin-Hancock Townships Fire Department	Dennis Raasio, Chief 482-8272 (home) Franklin Twp. Office 487-9073 (recording)	<ul style="list-style-type: none"> • Assist with fire suppression as needed. • Provide a point of contact for the public. • Provide structural fire suppression as needed. • Provide backup assistance as requested by FIREPRO Module.

G. Fire Related Agreements

See Appendix E for all interagency agreements.

VI. Monitoring and Evaluation

A. Monitoring Requirements

The goal of fire effects monitoring is to determine if the short-term fire objectives and the long-term resource management objectives are achieved. Since this park plans to use fire for the disposal of landscape debris, monitoring to determine whether objectives are met does not apply. Monitoring studies that examine soil condition and vegetation recovery rates at burn pile locations would be worthwhile. Variables such as organic content in the top 10 centimeters of soil or revegetation rates and plant composition at burn locations could be compared before and after fires and to other sites. Monitoring will indicate if alternative techniques should be employed or current techniques modified in the Prescribed Fire Plan.

B. Fire Monitoring Handbook and Deviations

The *Fire Monitoring Handbook 2001* (FMH) is a program guide used throughout much of the NPS to measure fire effects. Deviations from this protocol are allowed under certain circumstances.

C. The Park Fire Monitoring Plan

No formal monitoring program exists at the park. Because fire will be a minor and seldom employed tool for debris disposal, there are no plans for developing a formal monitoring program. Monitoring of fuel hazard conditions is a necessary program that will be undertaken by the FMO. Methods for monitoring will be taken from the *Fire Monitoring Handbook* (2001).

VII. Fire Research

A. Previous Research

No previous research has been done at this site. Research has been done in the northern Great Lakes region, but its application to this site has not been examined.

B. Fire Research Needs and Opportunities

A complete inventory of resources on site is necessary. A parkwide Resource Management Plan needs to be written, which will address fire research needs. Little is known of the natural and cultural resources that may exist. Vegetation must be inventoried. Cultural values need to be determined. Desired future conditions must be established so that management plans can be developed. Fire research will be part of the many investigations necessary on the Quincy Unit parcel.

Michigan Technological University is located in Houghton, Michigan, immediately across the Portage Canal from the Quincy Unit. The four-year state university has an accredited forestry school. There is potential for cooperative opportunities with the university.

Implementation of this FMP should not be contingent on completion of research of the local fire regime and fire effects, since this park plans to use fire only for the occasional disposal of debris. Scientific information regarding effects of fire and fire exclusion already exists for the region.

VIII. Public Safety

A. Public Safety Issues and Concerns

Wildland and prescribed fires can present a hazard to firefighters, the visiting public, and adjacent landowners. The safety of all people in the area is the primary concern. Primary consideration must be given to smoke, relative to the surrounding community and the US highway. Currently, the park does not promote visitation to the FMU. Prior to the use of prescribed fire, appropriate staff will survey the impacted areas within the FMU and inform visitors of the impending fire activities. Public will be evacuated from the prescription area. Staff will also contact adjacent landowners, as is practicable, whenever wildland or prescribed fire activities occur near their land.

B. Procedures for Mitigating Safety Issues

The concern will be to keep the public out of the immediate fire area, so that they will not hinder the activities or incur injury. Under no circumstance will anyone be permitted near a fire without the appropriate training and personal protective equipment.

In the case of a wildland fire that has potential for rapid spread, there is a possibility that visitors will be in areas of danger. Visitors will be informed at contact points regarding the fire and the area where caution should be exercised, especially at the Quincy Mine Hoist/NPS Information Desk facility.

Roads will be monitored by park staff, in conjunction with the Houghton County Sheriff Department, and closed around the burn area if visibility becomes an issue of public safety. When a fire threatens to escape from the park or has the potential to do so, adjacent authorities will be on hand, engaged in suppression activities, and will take appropriate action. Local fire fighters will be made aware of fire activities performed by a fire module and will assist in fire suppression and the protection of structures, should an unwanted fire occur. The local fire department would have the resources to immediately call in surrounding fire departments and state firefighters through mutual aid agreements.

IX. Public Information and Education

A. Public Fire Information Capabilities and Needs

An estimated 95% of wildland fires in Michigan are attributed to human activity (Michigan Interagency Wildland Fire Protection Association, 2003). An informed public can provide support for the fire management program and fire prevention at the park. A concerted effort will be made to educate public about fire concerns, including fire danger messages during periods of drought and fire presence in the area. Fire management messages will be introduced into interpretive programs where appropriate.

The park will participate in fire education activities in the community as practicable and will continue to work cooperatively with the Michigan Department of Natural Resources. Park visitors will be made aware of regulations prohibiting the use of fire within the park. High fire danger notices will be posted at cooperating facilities. The local media will be informed of fire prevention concerns through news releases, when appropriate. Media access to fire scenes will be facilitated when it is safe to do so. When interest is warranted, a staff member will be designated as the contact person for all information requests.

B. Step-up Plan Information Actions

Refer to Step-Up Plan.

X. Protection of Sensitive Resources

A. Summarize Archeological/Cultural/Historic Resources Requiring Sensitive Treatment or Special Protection.

Not all of the archaeological, cultural, and historical resources have been identified on this land. Known foundations are indicated on the topographic map (Figure 4) and are located in the southwestern corner of the parcel. The streetcar grade bisects much of the parcel (Figure 3). No other features are identified at this time, but material is expected to exist in the soil. Additionally, the residual landscape consisting of lilac bushes and apple trees may prove to be extant cultural landscape and a value on site. The southern section of the parcel which is located adjacent to the historic Franklin settlement, and includes the historic trolley grade and roads, should be considered archaeologically and historically sensitive because of the existence of extant foundations and landscape, and the potential for associated materials.

Damage is unlikely to be significant and will be mitigated during fire suppression by using MIST. Vehicles can access these sensitive areas from roadways. Impacts will be mitigated through maintaining firebreaks, such as mowed grass, and the use of MIST.

B. Natural Resources or Features Requiring Special Treatment or Consideration

No natural resources or features require special treatment, although protection of high quality specimens of native trees would be desirable. Since MIST would be used in fire suppression and all unwanted fire will be suppressed, these measures will be the best possible methods for the protection of these trees and other natural resources.

C. Developments, Infrastructure, In-holdings, and Other Improvements that Require Special Consideration or Protection

Urban-interface mitigation techniques should be applied to prevent or reduce negative impacts to neighboring residences. Two private holdings are nearly surrounded by the FMU. No improvements exist on the land. All privately owned structures are accessible from roadways.

XI. Fire Critiques and Annual Plan Review

All FMPs are subject to informal review annually with formal review every five years.

A. Critiques

All wildland fires occurring within the park will receive a review by those involved to evaluate such topics as: the initial response, “hotline” (on-going fire incident) review, After Action Reviews, control methods used, safety concerns, and the need for new and replacement equipment. This review will be conducted by one of the following: the Incident Commander, the Fire Management Officer, or the official who has designated fire program responsibility. The purpose of this review is to recognize and document actions that were successful and identify and rectify actions that were unsafe or ineffective.

In the event of major fire incidents the park superintendent will conduct closeout meetings with Incident Management Teams (IMT) to ensure a successful transition of the incident back to the park and to identify and evaluate incomplete fire business. Refer to Chapter 13, Exhibit 1 of RM-18 for a sample IMT closeout.

A regional or national level fire review may be conducted if one of the following occurs:

- fire crosses the parcel borders into another jurisdiction without the approval of landowner or agency;
- fire resulted in adverse media attention;
- fire involved serious injury or death, significant property damage, or has the potential to do so; or
- fire results in controversy involving another agency.

Refer to Chapter 13, Exhibits 2 & 3 of RM-18.

All entrapments and fire shelter deployments will be reported and investigated as soon as possible after the deployment incident. Refer to Chapter 13, Exhibit 4 & 5 of RM-18 for review directions and written outline format.

B. Plan Reviews

An informal fire management program review will be conducted annually to evaluate current procedures and identify any needed changes to the FMP. A formal fire management review will be conducted every five years. The park superintendent must approve significant changes to the body of this plan. The only exceptions to this procedure will be grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices. Changes requiring the approval and concurrence will be submitted with a new cover sheet for signature and dates, which will replace the original cover sheet upon receipt by the park superintendent.

XII. Consultation and Coordination

NPS team

Martha Armington, Management Assistant, Keweenaw NHP

Steve DeLong, Landscape Architect, Keweenaw NHP

Frank Fiala, Superintendent, Keweenaw NHP

KellyAnn Gorman, Fire Ecologist, Great Lakes Ecoregion, Voyageurs NP

Kathleen Harter, Chief of Interpretation, Keweenaw NHP

Charlie Masten, Facilities Manager, Keweenaw NHP

Sherry Middlemis-Brown, Biologist, Herbert Hoover National Historic Site

John Rosemurgy, Historical Architect, Keweenaw NHP

Ron Welton, Executive Director of Keweenaw NHP Advisory Commission

NPS consultants

Jim DeCoster, Fire Ecologist, Midwest Region, NPS

Jeff Richner, Archaeologist, Midwest Archaeological Center

List of individuals involved in scoping and consultation outside NPS

Martin F. Jurgensen, Professor School of Forest Resources & Environmental Science, Michigan Technological University

Daniel Laux, Forest Fire Supervisor, Michigan Department of Natural Resources

Bruce Petersen, District Conservationist, Natural Resources Conservation Service, USDA

Lori Sargent, Threatened and Endangered Species Database Manager, Michigan Department of Natural Resources

XIII. APPENDICES

- A. Bibliography and Literature Cited
- B. Definitions
- C. Species lists
- D. NEPA and NHPA compliance
- E. Any other unit-specific supplemental information
 - 1. Fire call-up list
 - 2. Preparedness inventory (*no inventory exists*)
 - 3. Cooperative agreements (*attached*)
- F. Wildland and Prescribed Fire Monitoring Plan (*no monitoring plan exists*)
- G. Pre-attack plan (*no formal plan exists, recommendations are presented*)
- H. Long-term prescribed fire and hazard fuel reduction plan
 - 1. Multi-year prescribed fire schedule (*No schedule has been determined or is needed. Use of prescribed fire for debris burning will be occasional and responsive to management needs.*)
 - 2. Hazard fuels reduction areas and schedule (*Maps and descriptions are provided within the document. Most hazard mitigation will be done through non-fire methods and will be responsive to seasonal needs. No hazard conditions currently exist, nor are they expected in the near future.*)
- I. Fire Prevention Plan (*no formal plan exists, but recommendations are provided*)
- J. Rental Equipment Agreements (*none exist*)
- K. Contracts for Suppression and Prescribed Fire Resources (*none exist*)
- L. Burned Area Emergency Stabilization and Rehabilitation Plan (*none exist*)

Appendix A. Bibliography and Literature Cited

- Albert, Dennis A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experimentation Station. Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/1998/rlandscp.htm> (Version 03JUN98).
- Anderson, H.E. 1982. Aids to Determining Fuel Models For Estimating Fire Behavior. General Technical Report INT-122, Forest Service, USDA. 22p.
- Chadde, Steve. 1996. Plants of the Copper Country - An Illustrated Guide to the Vascular Plants of Houghton and Keweenaw Counties, Michigan, and Isle Royale National Park. PocketFlora Press, Calumet, MI. 112 p.
- Dickman, D. I. and D. T. Cleland. Draft. Fire Return Intervals and Fire Cycles for Historic Fire Regimes in the Great Lakes Region: A Synthesis of the Literature. Draft manuscript. 20 pp.
- Gill, A.M. 1981. Fire adaptive traits in vascular plants. In pages 208-230, H.A. Mooney, T.M. Bonnicksen, N.L. Christensen, J.E. Lotan and W.A. Reiners (eds.) Fire Regimes and Ecosystem Properties. U.S. Forest Service, General Technical Report WO-26.
- Huff, M.H. and J.K. Smith. 2000. Fire effects on animal communities. In pages 53-58, J.K. Smith (ed.) Wildland Fire in Ecosystems: Effects of Fire on Fauna. General Technical Report RMRS-GTR-42-volume 1, US Forest Service, Rocky Mountain Research Station.
- Hutchison, Max. 1990. Johnson grass (*Sorghum halepense*). Vegetation Management Guideline, Vol. 1, No. 12. Natural Land Institute, University of Illinois, Urbana-Champaign. <http://www.inhs.uiuc.edu/edu/VMG/johngrass.html>
- Lyons, L.J., E.S. Telfer and D.S. Screiner. 2000. Direct effects of fire and animal responses. In pages 53-58, J.K. Smith (ed.) Wildland Fire in Ecosystems: Effects of Fire on Fauna. General Technical Report RMRS-GTR-42-volume 1, US Forest Service, Rocky Mountain Research Station.
- Olson, Steve. 1998. The Historical Occurrence of Fire in the Central Hardwoods. Fire, 58(3): 4-7.
- Pyne, S. 1982. Fire in America: A Cultural History of Wildland and Rural Fire. Princeton University Press, Princeton, N.J.
- Russel, Kevin R., David H. Van Lear, and David C. Guynn, Jr. 1999. Prescribed fire effects on herpetofauna: review and management implications. Wildlife Society Bulletin 27(2).
- Symonds, G. W. and A. W. Merwin. 1963. The Shrub Identification Book. William Morrow & Company, New York. 379 pp.
- USDA Forest Service. 1981. Effects of Fire on Flora: A State-of-Knowledge Review. National Fire Effects Workshop, Denver, CO, April 10-14, 1978. Gen. Tech. Rep WO-16: 71 pp.
- USDA Forest Service. 2001. A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.
- USDOI National Park Service. 2001. Fire Monitoring Handbook. Boise (ID): National Interagency Fire Center. 288p.

USDO/USDA. 1995. Federal Wildland Fire Management Policy.
USDO/USDA. 2001. Federal Wildland Fire Management Policy and Program Review.
USDO/USDA. 2001. Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems – A Cohesive Strategy
Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley & Sons. New York. 501 p.

Appendix B. Definitions

DI-1202 – Individual Fire Report form
DO-18 – NPS Director’s Order 18
DOI – Department of Interior
EA – Environmental Assessment
FIREPRO – National Park Service Fire Program
FMH -- Fire Monitoring Handbook
FMO -- Fire Management Officer
FMP -- Fire Management Plan
FMU – Fire Management Unit
GLA – Great Lakes Area (Ecoregion providing fire ecologist)
GMP – General Management Plan
IQCS – Interagency Qualification and Certification System
LAL – Lightning Activity Level
LCES – Lookouts, Communication Escape Routes, Safety Zones (the 4 Fire Orders)
MIST – Minimum Impact Suppression Tactics
MWR – Midwest Region
MWRO – Midwest Regional Office
NEPA – National Environmental Policy Act of 1969
NIFC -- National Interagency Fire Center
NFDRS – National Fire Danger Rating System
NPS – National Park Service
Park – Keweenaw National Historical Park
RM-18 – NPS Reference Manual 18, implementation guidelines for DO-18
RMP – Resource Management Plan
SACS -- Shared Application Computer Software
SHPO – State Historic Preservation Office
Unit – generic term for National Park Service facility
USDA – United States Department of Agricultural
USDO/USDA – United States Department of Interior
WFIP - Wildland Fire Implementation Plan
WFSA - Wildland Fire Situation Analysis, NPS RM-18

Appendix C. Species lists

No biological inventories have been initiated as of writing this plan. The Interdisciplinary Team members and a cooperating forester roughly surveyed the parcel for predominant vegetation species and their locations. The findings are summarized in Figure 3. There is a Michigan Natural Feature Inventory for

Houghton County that lists all state and federal status species found in the county
(http://web4.msue.msu.edu/mnfi/data/cnty_dat.cfm?h=&county=Houghton).

Appendix D. NEPA and NHPA Compliance

(Attached)

Appendix E. Unit-specific supplemental information (requires annual revision).

Fire call-up list

Name	Phone Number	Mandate/ Optional	When
County Sheriff's Office	Phone: 906-482-0055 Fax: 906-487-5949 hsheriff@ccisd.k12.mi.us	Mandatory	day before
State Police	Phone: 906-337-5145 Fax: 906-337-9955	Mandatory	day before
Quincy-Franklin-Hancock Townships Fire Department	Dennis Raasio, Chief 482-8272 (home) Franklin Twp. Office 487-9073 (recording)	Mandatory	week before and day before
Michigan Department of Natural Resources	Baraga District Office 906-353-6651	Mandatory	day before
Newspaper	The Daily Mining Gazette P.O. Box 368 Houghton, MI 49931 Phone: 1-800-682-7607 or (906) 482-1500 Fax: (906) 482-2726	Mandatory	day before
Residences adjacent to FMU – preceding letter is mandatory		A letter informing residents of prescribed fire one week before implementing is Mandatory; Optional follow-up	day before

No fire cache exists.

Interagency agreements are attached.

Appendix F. Wildland and Prescribed Fire Monitoring Plan

No monitoring plan exists.

Appendix G. Pre-attack plan

A Pre-attack Plan does not exist for this small unit. The park should gather the documents and make plans listed below. Many of the typical checklist items do not apply to this site and are shaded to indicate that they are not applicable.

PRE-ATTACK PLANNING CHECKLIST

COMMAND	OPERATIONS
Pre-positioning needs	Water sources
Draft delegation of authority	Control line locations
Management constraints	Natural barriers
Interagency agreements	Safety Zones
Evacuation procedures	Staging area locations
Structural protection needs	
Closure procedures	
LOGISTICS	PLANNING
Road, trails (including limitations)	Park base map
Utilities	Topographic maps
Medical facilities	Vegetation/fuel maps
Police, fire departments	Hazard locations (ground and aerial)
Communications (radio, telephone)	Archeological/cultural base map
Portable water sources	Special visitor use area
Maintenance facilities	Land status

Most of the items listed under Operations, Logistics, and Planning will be satisfied by reference to this FMP. Many items listed in the Command section should be covered in Park Standard Operating Procedures for general emergency situations. Pre-positioning needs and structural protection needs will be determined by the Hancock Fire Department with assistance from the park superintendent.

Appendix H. Long-term prescribed fire and hazard fuel reduction plan

No plan exists

Appendix I. Fire Prevention Plan (see RM-18, Chapter 8)

A formal Fire Prevention Plan does not exist for the park, since it is not fire prone and the parcel was newly acquired. The park realizes that education and enforcement of policy and rules are important to fire prevention. Open fire is not allowed on site. An informal plan acknowledges that the superintendent is responsible for:

1. Supporting and encouraging employee involvement in wildland fire prevention/education programs.
2. Developing and implementing wildland fire prevention plans as a component of the fire management plan and/or the resources management plan.
3. Preparing wildland fire prevention plans, which shall be reviewed annually and updated as required.
4. Integrating wildland fire prevention/education into all management functions, including interpretation, visitor protection, maintenance, and administration.
5. Developing cooperative agreements and/or memoranda of understanding with local land management agencies and wildland fire protection groups to coordinate wildland fire prevention/education programs.
6. Assessing, coordinating, and facilitating local wildland fire prevention/education training.
7. Developing and providing prevention/education which supports resource management.

A wildland fire prevention analysis is the basis for developing a plan and guides the measures taken in the plan. This analysis looks at the following topics.

Determination of Risks:

Risks are defined as any heat source or human activity that can result in wildland fire ignition. Risk assessment is the most important element of the analysis and is the foundation upon which the unit's fire prevention plan is built.

All potential ignition risks should be plotted on a topographic base map overlay of the unit (or in GIS). Risks to be plotted shall include all areas of concentrated use and incidents of human-caused fires.

The principle sources of fire would be discarded cigarettes along the highway and trucks accessing a commercial facility west of the parcel. No evidence of use by campers or other visitors has been evidenced on the parcel.

Determination of Hazards:

Hazards are defined as the fuels and the topography on which a wildland fire will spread. On a clear overlay of the base map (or in GIS), the areas of fuels and topography that present the greatest resistance to control, such as heavy fuels on steep slopes, should be encircled and labeled as "HIGH HAZARD" areas. Areas which

present moderate resistance to control, such as medium concentrations of continuous fuels in less rugged topography, should be encircled and labeled as “MODERATE HAZARD” areas. Everything remaining will be labeled as “LOW HAZARD” areas.

All areas are Low Hazard.

Determination of Values:

Values are defined as areas where losses from wildland fire would be unacceptable. Since the determination of values is subjective, they will be formulated through an interdisciplinary process.

Values may include cultural resources, developments, in-holdings, sensitive habitats, endangered species, watersheds, nearby urban structures, and adjacent land.

On a separate overlay of the base map (or in GIS), encircle those areas of high and moderate value as determined by the interdisciplinary team. Label these as “HIGH VALUE” or “MODERATE VALUE” areas. Everything remaining will be labeled “LOW VALUE.”

Values on site have not been identified, although an immediate recognition of the existing foundations as values was made.

Additional information can be found in the Department of the Interior Wildfire Prevention Analysis and Planning Guide.

Wildland-Urban Interface:

The wildland-urban interface has made fire suppression and fire prevention education activities much more complex. Activities that can be effective in urban interface include:

1. **Fuels Modification.** Flammable vegetation should be cleared for 30 feet around structures, but clearance requirements may be greater in areas where slopes and heavy fuels are involved. Woodpiles and other flammable materials should be stored away from the structure.
2. **Construction Materials.** Structures with wood roofs and sidings are much more vulnerable to wildland fire ignition. Developers and homeowners should be encouraged to install non-combustible roof materials when possible, with consideration for historical integrity and sensitivity to the cultural landscape.
3. **Roofs and Chimneys.** Chimneys should be equipped with spark arresters of no more than ½” non-combustible screens. Roofs should be kept clear of leaves and needles.
4. **Access.** Access roads to structures should be cleared sufficiently to allow fire trucks safe access and exit. It is always desirable to have two separate routes of access.
5. **Water.** A good water supply is critical. In areas where water flow is low, an auxiliary water tank with pump may be necessary.
6. **Open-Flame Sources.** Incinerators, barbecues, welders, and similar open-flame sources should have sufficient clearances from flammable vegetation. A hose and shovel should be kept nearby when burning is underway.

Appendix J. Rental Equipment Agreements

None exist

Appendix K. Contracts for Suppression and Prescribed Fire Resources

None exist

Appendix L. Burned Area Emergency Stabilization and Rehabilitation Plan

None exist